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TABLES OF ISENTROPIC EXPANSIONS OF PARAHYDROGEN AND RELATED TRANSPORT PROPERTIES FOR TOTAL TEMPERATURES FROM 25 K TO 300 K AND FOR TOTAL PRESSURES FROM 1 ATM TO 10 ATM

By

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SUMMARY

The isentropic expansions of parahydrogen at various total pressures and total temperatures were numerically determined by iterating Mach number and by using a modified interval halving method. The calculated isentropic values and related properties are presented in tabulated form.

INTRODUCTION

The wind-tunnel has been the primary tool for experimental aerodynamic research and development for many decades. Because of the increase in size and speed of aircraft in recent years, a need has developed for an increase ground testing capability in terms of Reynolds number. This need has been well documented, for example, in reference 1 and 2. The need for a higher Reynolds number testing capability than presently exists is particularly apparent in programs aimed at the development of efficient transport aircraft or maneuvering fighter aircraft designed to operate at transonic speeds. A major problem in the transonic region is the effect of Reynolds number on shock boundary layer interactions, and in turn, on the aircraft stability and performance characteristics.

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At a given Mach number, the Reynolds number may be increased by using a heavy gas rather than air as the test gas, by increasing the size of the tunnel and model, by increasing the operating pressure of the tunnel, and by reducing the test temperature. The method chosen to increase Reynolds number will, in general, also affect dynamic pressure, mass flow rate, and the power consumption of the tunnel per unit run time. The use of a heavy gas is a well-known method of achieving high Reynolds number. However, the differences in the ratio of specific heats becomes important when compressibility effects become significant, thus making Freon-12 a questionable transonic test medium. The more common approaches of increased size and increased stagnation pressures involve serious problems related to such questions as construction and operating costs, model and support loads, and the possibility of providing continuous-flow capability. The fourth method, that of reduced test temperature, appears to offer an attractive solution to the preceding problems. However, as the test temperature is reduced, the properties of the test gas will begin, at some point, to deviate from the properties of an ideal gas. At cryogenic temperature real-gas effects may become appreciable and these effects on the aerodynamic test results must therefore be analyzed in order to determine if a particular gas is acceptable as a wind-tunnel test gas at cryogenic temperatures.

A cryogenic wind-tunnel concept has evolved at NASA-Langley Research Center in which liquid nitrogen is sprayed directly into the tunnel circuit to cool the tunnel structure, remove the heat input from the drive fan, and balance the heat conducted through the tunnel walls. Nitrogen is the

resulting test gas using this cooling procedure. Throughout the evolution of the cryogenic wind-tunnel concept at NASA-Langley Research Center, experimental and theoretical studies have been made to access the suitability of cryogenic nitrogen as a test gas. After analyzing real-gas isentropic and normal shock solutions, and performing two-dimensional airfoil pressure tests, Adcock, Kilgore, and Ray in reference 3 concluded that the real-gas effects of nitrogen pose no problem as far as its use in a transonic wind tunnel operating at cryogenic temperatures and at stagnation pressures up to 5 atmospheres.

Nitrogen is, of course, not the only gas which might be considered for use at cryogenic temperatures. However, in order to assure similarity between the flow over the model in the wind-tunnel and the vehicle is flight, it is essential that any candidate test gas behave, for all practical purposes, like an ideal diatomic gas.

In addition to nitrogen, one of the most promising diatomic gases is hydrogen. Due to its very low vapor temperature it is possible to achieve even higher test Reynolds numbers at a given total pressure by using cryogenic hydrogen rather than cryogenic nitrogen as the test gas. Alternatively, for a given size tunnel it is possible to achieve a required test Reynolds number at a lower total pressure in hydrogen than in nitrogen thus reducing model, sting, and balance loads.

As a part of a larger program aimed at determining the suitability as well as the practicality of using cryogenic hydrogen as a wind-tunnel

test gas, the various ratios describing isentropic expansions of para-hydrogen* at various total pressures and temperatures have been determined up to Mach 2 and compared with the corresponding values for an ideal diatomic gas. In addition, the local isentropic expansion coefficient, viscosity, thermal conductivity, and Prandtl number have also been determined for the various combinations of pressure, temperature and Mach number.

The purpose of this report is to present in tabular form the various isentropic expansion ratios and the corresponding transport properties of parahydrogen.

In order to expedite the publication of the tabular results no analysis is made in this paper.

SYMBOLS

A	area
c	speed of sound
H	enthalpy
M	Mach number

*Equilibrium hydrogen consists of ortho- and parahydrogen molecules. The difference in the direction of spin of the protons in the hydrogen molecule results in the two forms of hydrogen; ortho, in which the spins are in the same direction, and para, where the spins are in opposing directions. When liquid hydrogen evaporates, the equilibrium condition is essentially pure parahydrogen. This stable condition can even be maintained at ambient temperatures.

P	pressure
S	entropy
T	temperature
Δ	increment (i.e. ΔT increment of temperature)
ζ	local isentropic expansion coefficient
ρ	density

Subscripts:

i	iteration value
o	value used in subroutine ISENT
t	total conditions

Superscript:

*	sonic conditions

REAL-GAS ISENTROPIC SOLUTIONS

A computer program giving the thermodynamic and related properties of parahydrogen from the triple point to 300 K at pressures to 1000 bar was obtained from the National Bureau of Standards (NBS). The NBS program is an updated version of the one used by Weber in reference 4. Although the NBS program is slightly different from the one used by Weber, the uncertainty in the results are the same in each program and are discussed in the report by Weber. In order to make use of the NBS program, it was modified into a subprogram form (subprogram THERMO). The inputs to this subprogram are temperature and pressure, and the outputs are the thermodynamic and related properties.

Besides the main program, a subprogram (ISENT) was also developed that made use of THERMO. By using a modified interval halving technique, ISENT calculates pressure and other thermodynamic properties for a given temperature and entropy.

The main program basically centers around ISENT. By iterating on Mach number and employing a modified interval halving technique, the isentropic expansion of parahydrogen at various total temperatures and total pressures is calculated.

Other converging techniques, such as the Newton-Raphson and Müller methods were considered along with the interval halving technique. But, because of the additional calculations involved, which would mean calling THERMO more often, and due to the fact that a good first approximation could be made through the use of the ideal gas equations, the interval halving technique was selected.

Since the only region under consideration is in the gaseous phase, the saturation boundary was considered as the lower temperature and pressure limit and the calculations were stopped when the static pressure was within 10% of the saturation pressure at the particular static temperature. From a temperature point of view, this means that the static temperature was within approximately 1 K of the saturated condition.

Generalized flow charts for both the main program and subprogram ISENT are given in figure 1.

For the main program, the values of the total temperature and total pressure are initialized in step 1. The resulting total conditions (density, sound velocity, etc.) are then computed in step 2 using subprogram THERMO. In steps 3 through 7 the sonic conditions are determined using the interval halving technique. Step 8 is the start of the Mach number iteration and in steps 9 through 12 the conditions at the iterated Mach number are determined by using the interval halving method to converge on the corresponding static temperature. The ratios to the ideal gas values are computed in step 13 and the values are then printed in step 15.

ADDITIONAL FLOW AND TRANSPORT PROPERTIES

Local Isentropic Expansion Coefficient

The pressure and density relationship for the isentropic expansion of a real-gas may adequately be described by the exponential equation

$$p \propto \rho^{\zeta}$$

where ζ is defined as the local isentropic expansion coefficient. For ideal gases this coefficient is constant and equal to the specific heat ratio. For real-gases, the coefficient of isentropic expansion is, in general, not equal to the specific heat ratio, and may vary. In this report the local isentropic expansion coefficient is defined as:

$$\frac{P_{i-1}}{P_i} = \left(\frac{\rho_{i-1}}{\rho_i}\right)^{\zeta}$$

The values of this coefficient are listed on the second page of each table in the second column.

It was previously stated that to assure similarity between the flow over a model in the wind-tunnel and the vehicle in flight, it is essential that any candidate test gas behave, for all practical purposes, like an ideal diatomic gas. In addition to this requirement, the transport properties of the test gas should vary approximately the same as the transport properties of the atmosphere. In particular, for heat transfer studies the variations of the thermal conductivity and Prandtl number are of importance. Similarly, for the study of viscous effects, the variations of viscosity and Reynolds number should be considered.

The program supplied by the National Bureau of Standards does not calculate the transport properties. The viscosity is determined using the equation given by McCarty in reference 5. In his report McCarty discusses the development by Diller in obtaining this equation and the estimation of the error involved.

Roder, McCarty, and Hall give a linear interpolation subprogram for thermal conductivity in reference 6. Reference 6 also contains a discussion of the sources of the data and an estimation of the error to be expected.

USE OF TABLES

The tables are separated by total pressure conditions and subdivided by total temperature values. The divisions are as follows:

Table number	Total pressure, atm	Subdivision	Total temperature, K
I	1.0	A	25.0
		B	30.0
		C	40.0
		D	60.0
		E	80.0
		F	100.0
		G	200.0
		H	300.0
II	3.0	A	30.0
		B	35.0
		C	40.0
		D	60.0
		E	80.0
		F	100.0
		G	200.0
		H	300.0
III	5.0	A	35.0
		B	40.0
		C	60.0
		D	80.0
		E	100.0
		F	200.0
		G	300.0
IV	8.0	A	40.0
		B	45.0
		C	50.0
		D	60.0
		E	80.0
		F	100.0
		G	200.0
		H	300.0

Table number	Total pressure, atm	Subdivision	Total temperature, K
V	10.0	A	45.0
		B	50.0
		C	60.0
		D	80.0
		E	100.0
		F	200.0
		G	300.0

An explanation of the column headings is given in the section entitled Computer Output Dictionary, which immediately precedes the tables.

The last five columns of the first page of each table give the values of the various isentropic expansion ratios relative to the ideal diatomic gas values. For example, table II F at a Mach number of 1.0 gives a value of 0.9513 for the relative pressure ratio. This means that the real gas value of the pressure ratio necessary to expand to Mach 1.0 differs from the ideal gas value by 4.87%.

Some tables, for example table I A, have the statement "saturation boundary reached" printed on the last line. This means that at the last Mach number listed the static pressure is within 10% of the saturation pressure at that particular static temperature.

CONCLUDING REMARKS

The isentropic expansions of parahydrogen at various total pressures and temperatures were determined numerically by iterating Mach number and using a modified interval halving technique. These basic real-gas solutions and comparisons with the ideal diatomic gas solutions are

presented in tabular form for a range of total temperatures from 25 K to 300 K and a range of total pressures from 1 atm to 10 atm. Also included in the tables are the corresponding values of viscosity, thermal conductivity, Reynolds number per unit length, Prandtl number, and local expansion coefficient.

REFERENCES

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2. Poisson-Quinton, Philippe: From Wind Tunnel to Flight, the Role of the Laboratory in Aerospace Design. J. Aircraft, vol. 5, no. 3, May-June 1968, pp. 193-214.

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4. Weber, L. A.: Thermodynamic and Related Properties of Parahydrogen From the Triple Point to 300 K at Pressures to 1000 Bar. NASA SP-3088, 1975.

5. McCarty, R. D.; and Weber, L. A.: Thermophysical Properties of Parahydrogen From the Freezing Line to 5000 R for Pressures to 10,000 Psia. Nat. Bur. Stand. Tech. Note 617, 1972.

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COMPUTER OUTPUT DICTIONARY

A*/A	ratio of critical area (where the local speed is equal to the local speed of sound) to the local area
CP/CV	ratio of the specific heat at constant pressure to the specific heat at constant volume
MACH	Mach number
PT	total pressure, atm (1 atm = 101.3×10^3 N/m^2)
P/PT	ratio of static pressure to total pressure
RE/M	Reynolds number per meter, m^{-1}
RHOT	total density g/cm^3
RHO/RHOT	ratio of static density to total density
SVT	sound velocity at total conditions, m/sec
SV/SVT	ratio of the sound velocity at static conditions to the sound velocity at total conditions
TT	total temperature, K
T/TT	ratio of the static temperature to the total temperature
Z	compressibility factor, $P/\rho RT$

MAIN PROGRAM

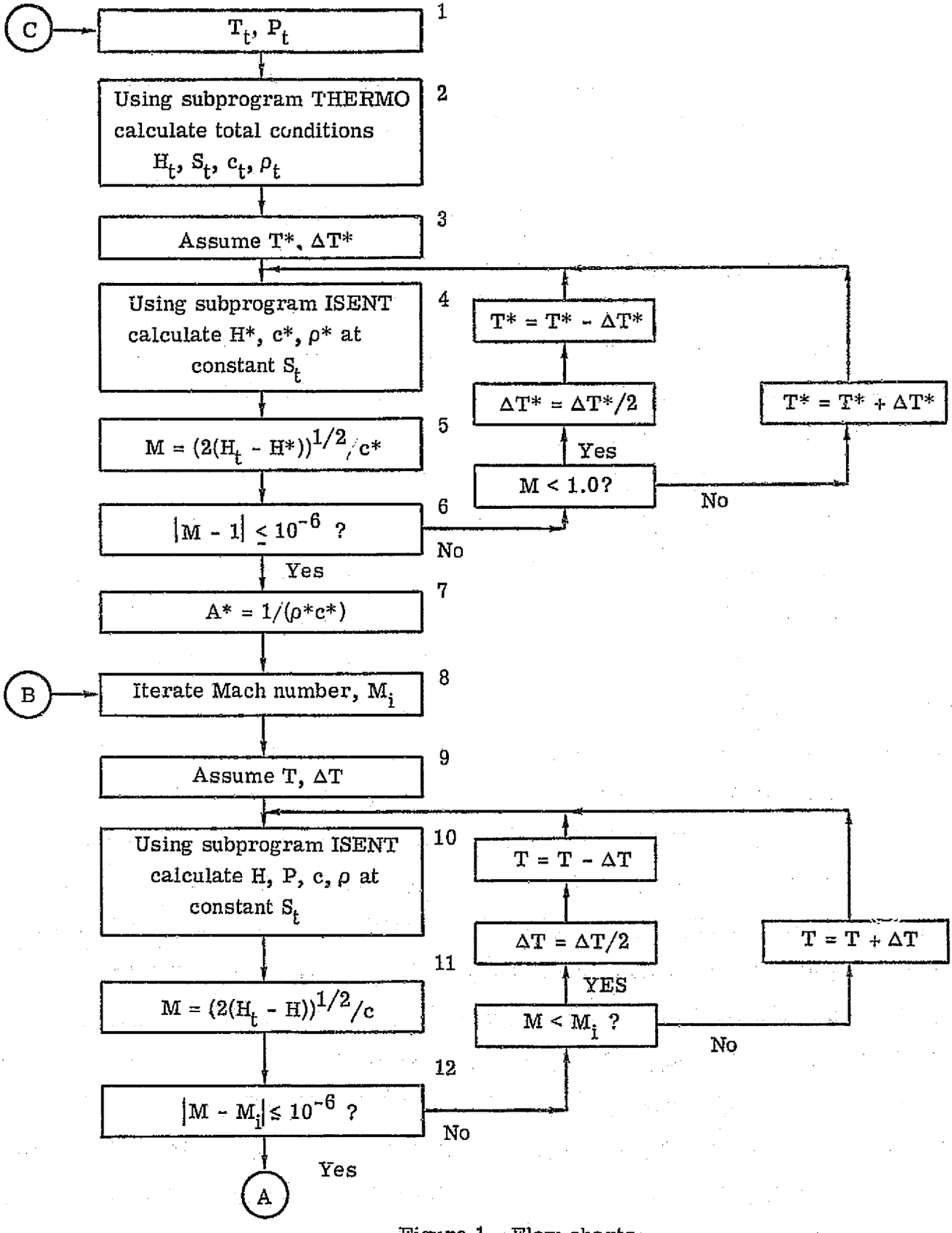
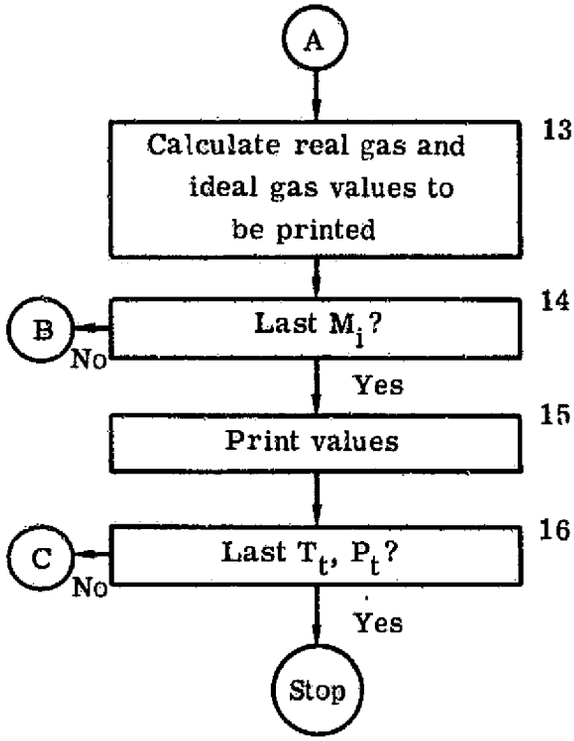


Figure 1. Flow charts.

MAIN PROGRAM, continued



SUBPROGRAM ISENT

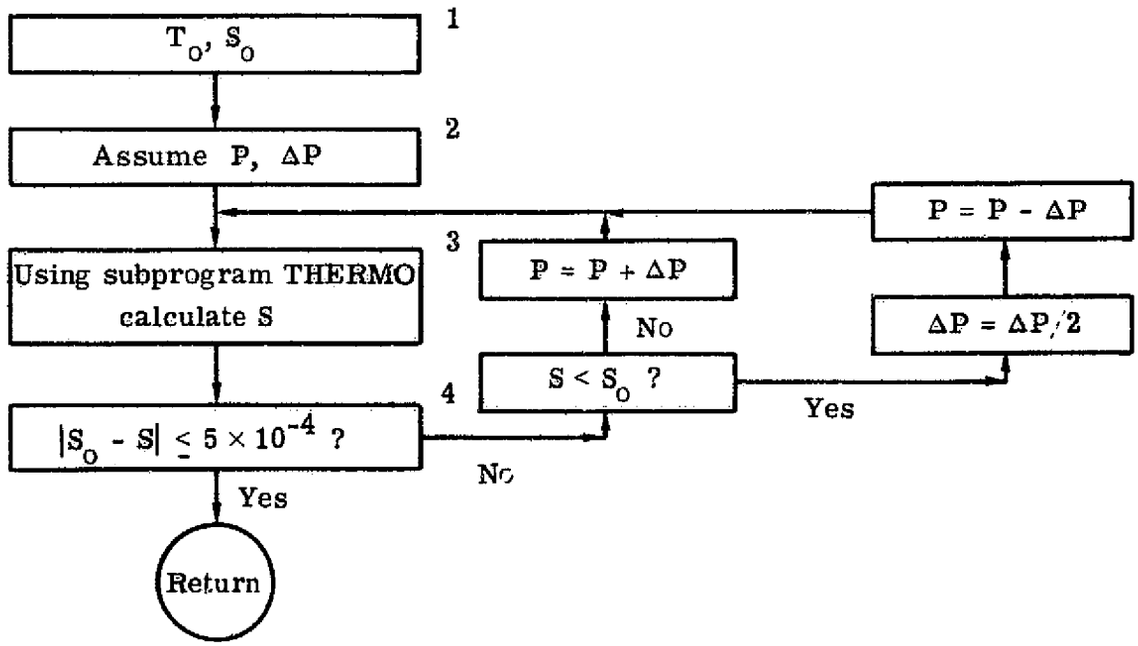


Figure 1. Concluded.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE I. REAL-GAS ISENTROPIC EXPANSION OF PARAHYDROGEN

A. TT = 25.0 K PT = 1.0 ATM RHOT = .104E-02 G/CM**3 SVT = 404.139 M/SEC

MACH	RE/M	γ	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	.9456	1.7767	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.153E+08	.9456	1.7767	.9996	.9979	.9992	.9984	.0889	.9998	.9997	.9997	1.0000	1.0303
.100	.305E+08	.9456	1.7766	.9983	.9916	.9966	.9949	.1769	.9993	.9986	.9986	.9999	1.0297
.150	.456E+08	.9456	1.7765	.9962	.9813	.9925	.9884	.2631	.9984	.9969	.9969	1.0000	1.0288
.200	.603E+08	.9456	1.7764	.9932	.9672	.9867	.9802	.3467	.9972	.9945	.9946	1.0000	1.0275
.250	.748E+08	.9456	1.7762	.9895	.9496	.9794	.9696	.4271	.9956	.9918	.9916	1.0002	1.0262
.300	.889E+08	.9456	1.7760	.9849	.9284	.9706	.9566	.5033	.9937	.9882	.9881	1.0002	1.0242
.350	.103E+09	.9456	1.7758	.9796	.9045	.9604	.9419	.5750	.9916	.9844	.9839	1.0006	1.0224
.400	.116E+09	.9456	1.7755	.9737	.8777	.9489	.9251	.6415	.9891	.9800	.9793	1.0009	1.0202
.450	.129E+09	.9455	1.7752	.9670	.8488	.9362	.9067	.7026	.9864	.9753	.9741	1.0013	1.0178
.500	.141E+09	.9455	1.7749	.9598	.8181	.9224	.8869	.7579	.9835	.9704	.9685	1.0020	1.0155
.550	.152E+09	.9455	1.7745	.9519	.7858	.9077	.8659	.8072	.9803	.9652	.9626	1.0028	1.0130
.600	.163E+09	.9455	1.7741	.9436	.7526	.8920	.8438	.8507	.9769	.9600	.9563	1.0040	1.0107
.650	.174E+09	.9455	1.7737	.9347	.7188	.8757	.8210	.8882	.9734	.9548	.9497	1.0055	1.0087
.700	.183E+09	.9455	1.7733	.9255	.6845	.8587	.7973	.9197	.9698	.9495	.9428	1.0072	1.0065
.750	.193E+09	.9455	1.7728	.9158	.6504	.8411	.7733	.9458	.9660	.9445	.9358	1.0094	1.0048
.800	.201E+09	.9456	1.7723	.9059	.6163	.8232	.7487	.9662	.9621	.9395	.9285	1.0118	1.0032
.850	.209E+09	.9456	1.7719	.8956	.5827	.8049	.7240	.9815	.9581	.9346	.9212	1.0146	1.0018
.900	.216E+09	.9456	1.7714	.8851	.5499	.7864	.6993	.9920	.9541	.9301	.9138	1.0179	1.0008
.950	.223E+09	.9456	1.7710	.8744	.5181	.7678	.6748	.9981	.9501	.9260	.9063	1.0217	1.0003
1.000	.229E+09	.9456	1.7705	.8636	.4871	.7491	.6503	1.0000	.9460	.9221	.8989	1.0258	1.0000
1.050	.235E+09	.9457	1.7702	.8526	.4574	.7304	.6262	.9983	.9419	.9187	.8914	1.0306	1.0003
1.100	.240E+09	.9457	1.7699	.8415	.4288	.7118	.6025	.9931	.9379	.9157	.8840	1.0357	1.0010

SATURATION BOUNDARY REACHED.

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.13738E-04	.48514E-04	.7561
.050	1.6967	.13726E-04	.48474E-04	.7561
.100	1.6554	.13693E-04	.48351E-04	.7562
.150	1.6768	.13637E-04	.48149E-04	.7563
.200	1.6724	.13560E-04	.47869E-04	.7564
.250	1.6856	.13462E-04	.47514E-04	.7565
.300	1.6656	.13344E-04	.47084E-04	.7567
.350	1.6804	.13207E-04	.46586E-04	.7570
.400	1.6716	.13052E-04	.46021E-04	.7573
.450	1.6729	.12881E-04	.45396E-04	.7576
.500	1.6721	.12694E-04	.44716E-04	.7581
.550	1.6713	.12493E-04	.43984E-04	.7585
.600	1.6730	.12279E-04	.43207E-04	.7591
.650	1.6742	.12055E-04	.42390E-04	.7597
.700	1.6698	.11820E-04	.41538E-04	.7604
.750	1.6743	.11577E-04	.40658E-04	.7611
.800	1.6692	.11328E-04	.39753E-04	.7620
.850	1.6682	.11072E-04	.38829E-04	.7629
.900	1.6687	.10812E-04	.38075E-04	.7602
.950	1.6711	.10549E-04	.37390E-04	.7558
1.000	1.6667	.10284E-04	.36711E-04	.7511
1.050	1.6692	.10018E-04	.36041E-04	.7460
1.100	1.6665	.97519E-05	.35381E-04	.7406

SATURATION BOUNDARY REACHED.

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. TT = 30.0 K PT = 1.0 ATM RHOT = .847E-03 G/CM³ SVT = 447.506 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9664	1.7347	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.117E+08	.9664	1.7347	.9996	.9979	.9992	.9988	.0888	.9998	.9997	1.0000	1.0008	1.0300
.100	.233E+08	.9664	1.7346	.9983	.9916	.9966	.9949	.1768	.9993	.9986	.9986	.9999	1.0294
.150	.348E+08	.9664	1.7346	.9962	.9813	.9925	.9888	.2630	.9984	.9969	.9970	1.0000	1.0285
.200	.461E+08	.9664	1.7345	.9933	.9672	.9867	.9802	.3466	.9972	.9945	.9946	1.0000	1.0273
.250	.572E+08	.9664	1.7345	.9895	.9496	.9794	.9696	.4270	.9957	.9918	.9917	1.0002	1.0260
.300	.680E+08	.9663	1.7343	.9850	.9284	.9706	.9566	.5032	.9938	.9882	.9881	1.0002	1.0240
.350	.784E+08	.9663	1.7342	.9798	.9045	.9604	.9418	.5749	.9917	.9844	.9840	1.0006	1.0222
.400	.885E+08	.9663	1.7341	.9739	.8777	.9490	.9251	.6414	.9893	.9800	.9793	1.0009	1.0200
.450	.981E+08	.9662	1.7339	.9672	.8488	.9363	.9067	.7025	.9866	.9753	.9742	1.0013	1.0177
.500	.107E+09	.9662	1.7337	.9600	.8181	.9225	.8870	.7579	.9837	.9704	.9686	1.0020	1.0154
.550	.116E+09	.9662	1.7335	.9522	.7858	.9077	.8659	.8072	.9806	.9652	.9627	1.0029	1.0130
.600	.124E+09	.9662	1.7333	.9439	.7526	.8921	.8439	.8507	.9772	.9600	.9563	1.0041	1.0108
.650	.132E+09	.9661	1.7331	.9351	.7187	.8757	.8209	.8882	.9738	.9547	.9497	1.0055	1.0086
.700	.139E+09	.9661	1.7328	.9258	.6844	.8587	.7973	.9198	.9701	.9493	.9429	1.0072	1.0066
.750	.146E+09	.9661	1.7325	.9162	.6501	.8411	.7731	.9457	.9664	.9442	.9358	1.0093	1.0048
.800	.153E+09	.9661	1.7323	.9063	.6161	.8232	.7487	.9663	.9625	.9391	.9285	1.0117	1.0032
.850	.158E+09	.9661	1.7320	.8961	.5825	.8048	.7240	.9816	.9586	.9342	.9211	1.0145	1.0019
.900	.164E+09	.9661	1.7316	.8856	.5497	.7863	.6993	.9922	.9546	.9297	.9137	1.0178	1.0009
.950	.169E+09	.9661	1.7313	.8749	.5177	.7676	.6747	.9982	.9506	.9254	.9061	1.0215	1.0003
1.000	.173E+09	.9661	1.7310	.8641	.4867	.7488	.6501	1.0000	.9465	.9213	.8986	1.0255	1.0000
1.050	.177E+09	.9661	1.7306	.8531	.4569	.7301	.6260	.9982	.9425	.9177	.8911	1.0302	1.0003
1.100	.181E+09	.9662	1.7303	.8420	.4284	.7114	.6023	.9931	.9384	.9146	.8836	1.0354	1.0010
1.150	.184E+09	.9662	1.7300	.8309	.4011	.6928	.5790	.9849	.9344	.9119	.8761	1.0411	1.0021
1.200	.187E+09	.9662	1.7296	.8198	.3751	.6745	.5563	.9742	.9303	.9097	.8687	1.0474	1.0038
1.250	.190E+09	.9663	1.7293	.8086	.3505	.6564	.5341	.9610	.9264	.9079	.8615	1.0540	1.0059
1.300	.192E+09	.9663	1.7290	.7975	.3272	.6385	.5125	.9458	.9225	.9065	.8543	1.0613	1.0085
1.350	.194E+09	.9664	1.7287	.7864	.3052	.6209	.4916	.9290	.9186	.9058	.8473	1.0691	1.0117
1.400	.196E+09	.9664	1.7284	.7754	.2846	.6037	.4714	.9109	.9148	.9056	.8404	1.0777	1.0156
1.450	.198E+09	.9665	1.7282	.7644	.2652	.5868	.4519	.8916	.9111	.9059	.8336	1.0867	1.0199
1.500	.199E+09	.9665	1.7279	.7535	.2470	.5704	.4330	.8713	.9074	.9067	.8270	1.0963	1.0248
1.550	.200E+09	.9666	1.7278	.7428	.2300	.5543	.4149	.8503	.9038	.9081	.8206	1.1064	1.0302
1.600	.201E+09	.9666	1.7276	.7322	.2140	.5386	.3974	.8287	.9003	.9098	.8143	1.1170	1.0360

SATURATION BOUNDARY REACHED.

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

P. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.16211E-04	.57156E-04	.7345
.050	1.6953	.16198E-04	.57109E-04	.7346
.100	1.6551	.16161E-04	.56969E-04	.7347
.150	1.6765	.16098E-04	.56737E-04	.7348
.200	1.6720	.16012E-04	.56415E-04	.7350
.250	1.6853	.15902E-04	.56007E-04	.7352
.300	1.6655	.15769E-04	.55515E-04	.7354
.350	1.6808	.15615E-04	.54945E-04	.7357
.400	1.6720	.15440E-04	.54302E-04	.7360
.450	1.6736	.15247E-04	.53590E-04	.7364
.500	1.6737	.15036E-04	.52817E-04	.7367
.550	1.6725	.14809E-04	.51987E-04	.7371
.600	1.6748	.14567E-04	.51106E-04	.7374
.650	1.6730	.14313E-04	.50185E-04	.7377
.700	1.6721	.14047E-04	.49213E-04	.7382
.750	1.6727	.13771E-04	.48201E-04	.7388
.800	1.6723	.13487E-04	.47160E-04	.7394
.850	1.6712	.13196E-04	.46095E-04	.7401
.900	1.6721	.12899E-04	.45013E-04	.7408
.950	1.6709	.12599E-04	.43917E-04	.7415
1.000	1.6678	.12295E-04	.42813E-04	.7422
1.050	1.6710	.11990E-04	.41706E-04	.7429
1.100	1.6701	.11684E-04	.40601E-04	.7436
1.150	1.6694	.11378E-04	.39501E-04	.7443
1.200	1.6704	.11074E-04	.38409E-04	.7451
1.250	1.6675	.10772E-04	.37519E-04	.7420
1.300	1.6672	.10472E-04	.36789E-04	.7357
1.350	1.6681	.10176E-04	.36079E-04	.7291
1.400	1.6700	.98842E-05	.35389E-04	.7222
1.450	1.6683	.95966E-05	.34719E-04	.7149
1.500	1.6679	.93142E-05	.34070E-04	.7073
1.550	1.6674	.90370E-05	.33441E-04	.6994
1.600	1.6654	.87655E-05	.32832E-04	.6913

SATURATION BOUNDARY REACHED.

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. TT = 40.0 K PT = 1.0 ATM RHOT = .624E-03 G/CM3 SVT = 521.238 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	.9845	1.6993	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.781E+07	.9845	1.6993	.9996	.9979	.9992	.9988	.0888	.9998	.9997	.9997	1.0000	1.0295
.100	.156E+08	.9845	1.6993	.9983	.9916	.9967	.9949	.1767	.9993	.9986	.9987	.9999	1.0288
.150	.232E+08	.9845	1.6993	.9962	.9813	.9925	.9888	.2629	.9985	.9969	.9970	.9999	1.0280
.200	.308E+08	.9845	1.6993	.9933	.9674	.9868	.9804	.3465	.9973	.9948	.9947	1.0002	1.0270
.250	.382E+08	.9845	1.6994	.9896	.9496	.9795	.9696	.4268	.9958	.9918	.9917	1.0002	1.0254
.300	.454E+08	.9844	1.6994	.9852	.9286	.9707	.9567	.5031	.9940	.9885	.9882	1.0004	1.0238
.350	.523E+08	.9844	1.6994	.9800	.9045	.9606	.9417	.5747	.9919	.9844	.9841	1.0005	1.0217
.400	.590E+08	.9844	1.6994	.9741	.8779	.9491	.9251	.6413	.9895	.9802	.9795	1.0009	1.0197
.450	.653E+08	.9843	1.6993	.9675	.8489	.9365	.9067	.7023	.9869	.9755	.9744	1.0013	1.0175
.500	.714E+08	.9843	1.6993	.9603	.8182	.9227	.8869	.7577	.9840	.9705	.9689	1.0020	1.0152
.550	.771E+08	.9842	1.6993	.9525	.7861	.9080	.8660	.8072	.9809	.9655	.9629	1.0030	1.0130
.600	.825E+08	.9842	1.6992	.9443	.7526	.8924	.8437	.8505	.9777	.9600	.9567	1.0039	1.0105
.650	.876E+08	.9841	1.6991	.9355	.7187	.8760	.8207	.8879	.9742	.9547	.9501	1.0053	1.0084
.700	.923E+08	.9841	1.6990	.9263	.6845	.8591	.7972	.9197	.9706	.9495	.9432	1.0071	1.0065
.750	.967E+08	.9840	1.6989	.9167	.6501	.8415	.7730	.9455	.9669	.9442	.9362	1.0090	1.0045
.800	.101E+09	.9840	1.6988	.9068	.6161	.8236	.7485	.9661	.9631	.9391	.9290	1.0115	1.0030
.850	.104E+09	.9840	1.6987	.8966	.5825	.8053	.7238	.9815	.9592	.9342	.9216	1.0143	1.0018
.900	.108E+09	.9839	1.6985	.8862	.5497	.7867	.6991	.9921	.9553	.9297	.9142	1.0176	1.0009
.950	.111E+09	.9839	1.6984	.8755	.5177	.7680	.6745	.9981	.9513	.9254	.9067	1.0213	1.0003
1.000	.114E+09	.9838	1.6982	.8647	.4867	.7493	.6500	1.0000	.9472	.9213	.8991	1.0254	1.0000
1.050	.116E+09	.9838	1.6981	.8537	.4569	.7305	.6259	.9983	.9432	.9177	.8916	1.0301	1.0003
1.100	.118E+09	.9838	1.6979	.8427	.4282	.7119	.6020	.9929	.9391	.9143	.8841	1.0350	1.0008
1.150	.120E+09	.9838	1.6978	.8316	.4010	.6933	.5789	.9849	.9351	.9118	.8767	1.0408	1.0021
1.200	.122E+09	.9838	1.6976	.8204	.3750	.6749	.5561	.9741	.9311	.9094	.8693	1.0470	1.0037
1.250	.123E+09	.9839	1.6974	.8093	.3504	.6568	.5339	.9609	.9272	.9076	.8620	1.0536	1.0058
1.300	.125E+09	.9838	1.6972	.7982	.3271	.6389	.5123	.9458	.9232	.9062	.8549	1.0609	1.0085
1.350	.126E+09	.9838	1.6971	.7871	.3051	.6214	.4914	.9290	.9194	.9054	.8478	1.0687	1.0117
1.400	.127E+09	.9838	1.6969	.7760	.2844	.6041	.4712	.9107	.9156	.9051	.8409	1.0771	1.0154
1.450	.127E+09	.9838	1.6967	.7651	.2650	.5872	.4516	.8914	.9119	.9053	.8342	1.0861	1.0197
1.500	.128E+09	.9838	1.6965	.7542	.2468	.5707	.4328	.8711	.9082	.9061	.8275	1.0957	1.0246
1.550	.129E+09	.9838	1.6964	.7435	.2298	.5546	.4147	.8501	.9046	.9073	.8211	1.1059	1.0300
1.600	.129E+09	.9838	1.6962	.7328	.2139	.5389	.3972	.8285	.9011	.9090	.8148	1.1165	1.0359
1.650	.129E+09	.9839	1.6960	.7223	.1990	.5236	.3804	.8067	.8977	.9114	.8086	1.1278	1.0424
1.700	.129E+09	.9839	1.6959	.7119	.1852	.5087	.3644	.7846	.8943	.9142	.8027	1.1397	1.0495
1.750	.129E+09	.9839	1.6957	.7017	.1723	.4942	.3490	.7624	.8911	.9175	.7969	1.1522	1.0571
1.800	.129E+09	.9839	1.6955	.6916	.1603	.4801	.3342	.7402	.8879	.9213	.7912	1.1651	1.0651
1.850	.129E+09	.9840	1.6954	.6817	.1492	.4665	.3201	.7183	.8848	.9258	.7857	1.1790	1.0740
1.900	.129E+09	.9840	1.6952	.6720	.1389	.4532	.3066	.6964	.8818	.9305	.7804	1.1929	1.0831
1.950	.129E+09	.9841	1.6951	.6624	.1293	.4404	.2937	.6750	.8789	.9360	.7753	1.2079	1.0931
2.000	.129E+09	.9841	1.6950	.6530	.1203	.4279	.2813	.6537	.8760	.9416	.7703	1.2230	1.1031

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.20797E-04	.73845E-04	.7120
.050	1.6920	.20782E-04	.73788E-04	.7121
.100	1.6516	.20737E-04	.73615E-04	.7122
.150	1.6734	.20663E-04	.73329E-04	.7124
.200	1.6886	.20560E-04	.72933E-04	.7126
.250	1.6671	.20429E-04	.72430E-04	.7129
.300	1.6762	.20271E-04	.71826E-04	.7133
.350	1.6668	.20087E-04	.71126E-04	.7137
.400	1.6752	.19879E-04	.70336E-04	.7141
.450	1.6717	.19647E-04	.69463E-04	.7146
.500	1.6721	.19395E-04	.68514E-04	.7151
.550	1.6757	.19123E-04	.67497E-04	.7156
.600	1.6661	.18834E-04	.66419E-04	.7161
.650	1.6722	.18528E-04	.65289E-04	.7166
.700	1.6753	.18209E-04	.64114E-04	.7170
.750	1.6687	.17877E-04	.62902E-04	.7174
.800	1.6720	.17534E-04	.61659E-04	.7178
.850	1.6720	.17183E-04	.60392E-04	.7180
.900	1.6722	.16824E-04	.59039E-04	.7191
.950	1.6713	.16460E-04	.57671E-04	.7201
1.000	1.6690	.16091E-04	.56296E-04	.7210
1.050	1.6717	.15719E-04	.54921E-04	.7219
1.100	1.6664	.15346E-04	.53548E-04	.7227
1.150	1.6735	.14973E-04	.52184E-04	.7235
1.200	1.6690	.14600E-04	.50831E-04	.7241
1.250	1.6688	.14229E-04	.49495E-04	.7247
1.300	1.6687	.13860E-04	.48137E-04	.7257
1.350	1.6694	.13495E-04	.46787E-04	.7269
1.400	1.6686	.13134E-04	.45458E-04	.7280
1.450	1.6695	.12778E-04	.44154E-04	.7290
1.500	1.6693	.12427E-04	.42876E-04	.7300
1.550	1.6685	.12081E-04	.41625E-04	.7310
1.600	1.6668	.11742E-04	.40403E-04	.7316
1.650	1.6690	.11409E-04	.39211E-04	.7326
1.700	1.6686	.11083E-04	.38051E-04	.7333
1.750	1.6679	.10765E-04	.37079E-04	.7308
1.800	1.6665	.10453E-04	.36367E-04	.7234
1.850	1.6706	.10149E-04	.35680E-04	.7158
1.900	1.6647	.98517E-05	.35017E-04	.7080
1.950	1.6705	.95623E-05	.34377E-04	.6999
2.000	1.6642	.92804E-05	.33760E-04	.6916

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. TT = 60.0 K PT = 1.0 ATM RHOT = .411E-03 G/CM3 SVT = 635.721 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9954	1.6482	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.453E+07	.9954	1.6484	.9996	.9979	.9992	.9987	.0682	.9999	.9997	.9997	1.0000	1.0221
.100	.903E+07	.9954	1.6488	.9986	.9918	.9968	.9950	.1755	.9996	.9988	.9988	1.0000	1.0218
.150	.135E+08	.9954	1.6495	.9968	.9818	.9929	.9889	.2612	.9990	.9974	.9973	1.0001	1.0214
.200	.178E+08	.9954	1.6506	.9943	.9679	.9874	.9804	.3444	.9983	.9953	.9953	1.0001	1.0206
.250	.221E+08	.9954	1.6518	.9911	.9503	.9804	.9694	.4243	.9973	.9926	.9926	1.0000	1.0195
.300	.263E+08	.9953	1.6533	.9873	.9296	.9719	.9565	.5005	.9961	.9895	.9894	1.0002	1.0185
.350	.303E+08	.9953	1.6550	.9827	.9058	.9621	.9416	.5721	.9947	.9859	.9857	1.0003	1.0172
.400	.341E+08	.9953	1.6568	.9775	.8793	.9510	.9248	.6388	.9931	.9818	.9814	1.0006	1.0157
.450	.378E+08	.9952	1.6586	.9717	.8505	.9387	.9063	.7000	.9912	.9773	.9767	1.0009	1.0141
.500	.412E+08	.9952	1.6606	.9652	.8199	.9252	.8864	.7556	.9890	.9726	.9715	1.0014	1.0125
.550	.445E+08	.9951	1.6625	.9581	.7878	.9107	.8653	.8055	.9867	.9676	.9658	1.0022	1.0108
.600	.476E+08	.9951	1.6644	.9505	.7543	.8953	.8428	.8491	.9841	.9622	.9598	1.0028	1.0089
.650	.504E+08	.9950	1.6662	.9423	.7204	.8791	.8198	.8870	.9813	.9569	.9534	1.0041	1.0073
.700	.531E+08	.9950	1.6680	.9337	.6860	.8622	.7960	.9190	.9784	.9515	.9467	1.0056	1.0057
.750	.555E+08	.9949	1.6696	.9246	.6515	.8448	.7716	.9451	.9752	.9461	.9398	1.0072	1.0041
.800	.577E+08	.9949	1.6710	.9150	.6172	.8268	.7469	.9658	.9718	.9408	.9326	1.0093	1.0027
.850	.597E+08	.9948	1.6723	.9051	.5834	.8085	.7220	.9812	.9683	.9356	.9253	1.0117	1.0015
.900	.615E+08	.9948	1.6735	.8950	.5503	.7899	.6971	.9918	.9647	.9307	.9179	1.0146	1.0006
.950	.631E+08	.9947	1.6744	.8845	.5182	.7712	.6724	.9980	.9610	.9262	.9104	1.0181	1.0002
1.000	.646E+08	.9947	1.6753	.8738	.4871	.7524	.6479	1.0000	.9572	.9220	.9028	1.0220	1.0000
1.050	.658E+08	.9946	1.6759	.8629	.4570	.7335	.6236	.9980	.9533	.9180	.8953	1.0262	1.0001
1.100	.669E+08	.9946	1.6765	.8519	.4284	.7148	.5998	.9929	.9494	.9146	.8878	1.0311	1.0008
1.150	.679E+08	.9945	1.6769	.8408	.4010	.6961	.5766	.9848	.9455	.9118	.8803	1.0367	1.0020
1.200	.687E+08	.9945	1.6772	.8296	.3749	.6777	.5537	.9738	.9416	.9091	.8729	1.0425	1.0034
1.250	.694E+08	.9945	1.6775	.8184	.3502	.6595	.5316	.9607	.9376	.9072	.8656	1.0492	1.0057
1.300	.699E+08	.9944	1.6776	.8072	.3269	.6415	.5100	.9455	.9338	.9057	.8584	1.0562	1.0082
1.350	.703E+08	.9944	1.6777	.7961	.3049	.6239	.4892	.9288	.9299	.9049	.8513	1.0640	1.0114
1.400	.707E+08	.9944	1.6778	.7849	.2842	.6066	.4691	.9105	.9261	.9045	.8444	1.0723	1.0152
1.450	.709E+08	.9944	1.6779	.7739	.2648	.5896	.4495	.8910	.9224	.9045	.8376	1.0810	1.0193
1.500	.710E+08	.9943	1.6778	.7629	.2466	.5731	.4307	.8707	.9187	.9052	.8310	1.0905	1.0241
1.550	.711E+08	.9943	1.6778	.7521	.2295	.5569	.4127	.8497	.9151	.9064	.8245	1.1006	1.0295
1.600	.711E+08	.9943	1.6778	.7413	.2136	.5411	.3953	.8282	.9115	.9081	.8182	1.1112	1.0354
1.650	.711E+08	.9943	1.6777	.7307	.1988	.5258	.3786	.8063	.9081	.9104	.8120	1.1224	1.0419
1.700	.710E+08	.9943	1.6777	.7203	.1850	.5108	.3626	.7842	.9047	.9131	.8061	1.1342	1.0490
1.750	.708E+08	.9943	1.6776	.7099	.1721	.4963	.3472	.7620	.9014	.9164	.8002	1.1465	1.0565
1.800	.706E+08	.9943	1.6776	.6997	.1602	.4822	.3326	.7399	.8982	.9203	.7946	1.1595	1.0647
1.850	.703E+08	.9942	1.6775	.6897	.1490	.4685	.3185	.7178	.8951	.9245	.7891	1.1730	1.0733
1.900	.700E+08	.9942	1.6774	.6798	.1387	.4552	.3050	.6960	.8921	.9293	.7838	1.1870	1.0824
1.950	.697E+08	.9942	1.6774	.6701	.1291	.4423	.2922	.6745	.8891	.9347	.7787	1.2018	1.0923
2.000	.694E+08	.9942	1.6773	.6606	.1202	.4298	.2800	.6534	.8862	.9404	.7737	1.2170	1.1025

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.28843E-04	.10789E-03	.6847
.050	1.6379	.28825E-04	.10780E-03	.6847
.100	1.6428	.28771E-04	.10754E-03	.6847
.150	1.6487	.28681E-04	.10711E-03	.6849
.200	1.6401	.28556E-04	.10651E-03	.6850
.250	1.6379	.28397E-04	.10575E-03	.6853
.300	1.6473	.28204E-04	.10484E-03	.6856
.350	1.6465	.27978E-04	.10377E-03	.6860
.400	1.6477	.27722E-04	.10256E-03	.6866
.450	1.6485	.27436E-04	.10121E-03	.6873
.500	1.6526	.27122E-04	.99442E-04	.6902
.550	1.6564	.26783E-04	.97976E-04	.6905
.600	1.6507	.26420E-04	.96417E-04	.6909
.650	1.6610	.26035E-04	.94776E-04	.6914
.700	1.6597	.25630E-04	.93068E-04	.6920
.750	1.6591	.25208E-04	.91302E-04	.6927
.800	1.6611	.24771E-04	.89488E-04	.6935
.850	1.6624	.24322E-04	.87638E-04	.6944
.900	1.6638	.23862E-04	.85762E-04	.6954
.950	1.6676	.23393E-04	.83843E-04	.6966
1.000	1.6659	.22918E-04	.81912E-04	.6980
1.050	1.6640	.22438E-04	.79895E-04	.7001
1.100	1.6679	.21955E-04	.77991E-04	.7013
1.150	1.6699	.21471E-04	.76100E-04	.7026
1.200	1.6652	.20986E-04	.74227E-04	.7037
1.250	1.6699	.20503E-04	.72378E-04	.7049
1.300	1.6665	.20022E-04	.70556E-04	.7059
1.350	1.6702	.19544E-04	.68758E-04	.7069
1.400	1.6688	.19071E-04	.66992E-04	.7079
1.450	1.6657	.18603E-04	.65263E-04	.7087
1.500	1.6693	.18140E-04	.63571E-04	.7093
1.550	1.6680	.17684E-04	.61920E-04	.7099
1.600	1.6682	.17235E-04	.60309E-04	.7103
1.650	1.6686	.16793E-04	.58664E-04	.7114
1.700	1.6679	.16359E-04	.57035E-04	.7128
1.750	1.6672	.15933E-04	.55451E-04	.7148
1.800	1.6689	.15516E-04	.53911E-04	.7151
1.850	1.6665	.15107E-04	.52416E-04	.7160
1.900	1.6667	.14707E-04	.50966E-04	.7169
1.950	1.6692	.14315E-04	.49560E-04	.7175
2.000	1.6670	.13933E-04	.48166E-04	.7185

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. TT = 80.0 K PT = 1.0 ATM PHOT = .306E-03 G/CM3 SVT = 713.635 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9986	1.5489	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.306E+07	.9985	1.5492	.9998	.9981	.9993	.9988	.0867	1.0000	.9998	.9998	1.0000	1.0049
.100	.610E+07	.9985	1.5501	.9990	.9923	.9973	.9950	.1726	1.0000	.9993	.9993	1.0000	1.0049
.150	.910E+07	.9985	1.5516	.9978	.9828	.9939	.9889	.2570	1.0000	.9984	.9984	1.0000	1.0050
.200	.121E+08	.9985	1.5536	.9960	.9696	.9892	.9803	.3391	1.0000	.9971	.9971	1.0000	1.0049
.250	.149E+08	.9985	1.5562	.9938	.9530	.9831	.9695	.4183	1.0000	.9954	.9954	1.0000	1.0049
.300	.177E+08	.9985	1.5593	.9910	.9331	.9758	.9564	.4938	.9999	.9933	.9933	1.0000	1.0048
.350	.204E+08	.9985	1.5630	.9878	.9103	.9672	.9413	.5651	.9998	.9908	.9909	1.0000	1.0048
.400	.230E+08	.9984	1.5672	.9840	.8847	.9577	.9242	.6317	.9997	.9878	.9880	1.0000	1.0045
.450	.255E+08	.9984	1.5718	.9798	.8569	.9463	.9056	.6934	.9994	.9846	.9846	1.0001	1.0044
.500	.278E+08	.9984	1.5769	.9750	.8268	.9342	.8853	.7494	.9991	.9808	.9809	1.0001	1.0041
.550	.300E+08	.9983	1.5824	.9697	.7952	.9210	.8637	.7999	.9986	.9767	.9767	1.0003	1.0038
.600	.320E+08	.9983	1.5882	.9640	.7623	.9068	.8409	.8445	.9981	.9723	.9720	1.0005	1.0035
.650	.339E+08	.9982	1.5942	.9577	.7282	.8916	.8170	.8831	.9973	.9673	.9670	1.0007	1.0029
.700	.357E+08	.9982	1.6004	.9508	.6938	.8756	.7925	.9161	.9964	.9624	.9614	1.0013	1.0026
.750	.373E+08	.9982	1.6067	.9435	.6589	.8589	.7674	.9430	.9952	.9569	.9555	1.0018	1.0019
.800	.387E+08	.9981	1.6131	.9357	.6241	.8415	.7420	.9645	.9938	.9514	.9492	1.0027	1.0014
.850	.401E+08	.9981	1.6193	.9275	.5897	.8236	.7164	.9807	.9922	.9458	.9426	1.0039	1.0009
.900	.412E+08	.9980	1.6253	.9187	.5559	.8052	.6907	.9917	.9904	.9402	.9357	1.0053	1.0005
.950	.422E+08	.9980	1.6311	.9096	.5228	.7865	.6651	.9980	.9883	.9345	.9285	1.0070	1.0001
1.000	.431E+08	.9979	1.6366	.9000	.4908	.7676	.6398	1.0000	.9859	.9291	.9211	1.0093	1.0000
1.050	.439E+08	.9979	1.6417	.8901	.4601	.7485	.6151	.9982	.9834	.9241	.9136	1.0122	1.0002
1.100	.446E+08	.9979	1.6463	.8799	.4306	.7295	.5907	.9927	.9806	.9193	.9060	1.0154	1.0006
1.150	.451E+08	.9978	1.6505	.8694	.4025	.7104	.5670	.9843	.9776	.9151	.8983	1.0194	1.0015
1.200	.456E+08	.9978	1.6541	.8587	.3758	.6915	.5438	.9730	.9745	.9112	.8907	1.0238	1.0027
1.250	.459E+08	.9978	1.6574	.8478	.3505	.6728	.5213	.9594	.9713	.9079	.8831	1.0289	1.0043
1.300	.462E+08	.9977	1.6601	.8368	.3268	.6544	.4997	.9440	.9679	.9053	.8756	1.0349	1.0066
1.350	.464E+08	.9977	1.6625	.8257	.3044	.6363	.4788	.9267	.9645	.9032	.8682	1.0413	1.0092
1.400	.465E+08	.9977	1.6645	.8145	.2834	.6185	.4587	.9082	.9610	.9019	.8609	1.0486	1.0126
1.450	.466E+08	.9976	1.6661	.8033	.2638	.6011	.4392	.8885	.9575	.9011	.8539	1.0563	1.0164
1.500	.466E+08	.9976	1.6674	.7922	.2455	.5841	.4207	.8680	.9539	.9011	.8469	1.0650	1.0209
1.550	.466E+08	.9976	1.6685	.7811	.2283	.5675	.4027	.8467	.9504	.9015	.8402	1.0741	1.0258
1.600	.465E+08	.9975	1.6693	.7701	.2124	.5514	.3856	.8251	.9469	.9028	.8336	1.0840	1.0315
1.650	.463E+08	.9975	1.6700	.7591	.1976	.5356	.3692	.8031	.9434	.9046	.8273	1.0946	1.0378
1.700	.462E+08	.9975	1.6705	.7483	.1837	.5203	.3535	.7809	.9400	.9070	.8211	1.1057	1.0445
1.750	.460E+08	.9975	1.6709	.7376	.1709	.5055	.3384	.7587	.9367	.9099	.8151	1.1175	1.0519
1.800	.458E+08	.9975	1.6711	.7271	.1590	.4911	.3241	.7365	.9334	.9134	.8093	1.1298	1.0598
1.850	.455E+08	.9974	1.6713	.7167	.1479	.4771	.3103	.7145	.9302	.9175	.8037	1.1429	1.0683
1.900	.452E+08	.9974	1.6715	.7065	.1376	.4636	.2973	.6929	.9271	.9223	.7983	1.1567	1.0776
1.950	.450E+08	.9974	1.6716	.6964	.1281	.4504	.2847	.6714	.9240	.9274	.7930	1.1708	1.0872
2.000	.446E+08	.9974	1.6716	.6865	.1192	.4377	.2727	.6503	.9211	.9331	.7879	1.1856	1.0974

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.35851E-04	.14507E-03	.6952
.050	1.5471	.35832E-04	.14495E-03	.6952
.100	1.5517	.35778E-04	.14457E-03	.6953
.150	1.5493	.35687E-04	.14395E-03	.6953
.200	1.5486	.35560E-04	.14308E-03	.6953
.250	1.5536	.35398E-04	.14197E-03	.6955
.300	1.5539	.35200E-04	.14063E-03	.6956
.350	1.5592	.34967E-04	.13922E-03	.6951
.400	1.5597	.34701E-04	.13776E-03	.6938
.450	1.5697	.34400E-04	.13612E-03	.6924
.500	1.5700	.34068E-04	.13431E-03	.6910
.550	1.5782	.33704E-04	.13234E-03	.6896
.600	1.5830	.33310E-04	.13022E-03	.6883
.650	1.5857	.32888E-04	.12796E-03	.6870
.700	1.5983	.32439E-04	.12558E-03	.6860
.750	1.6087	.31965E-04	.12308E-03	.6851
.800	1.6072	.31469E-04	.12049E-03	.6845
.850	1.6141	.30952E-04	.11786E-03	.6839
.900	1.6200	.30419E-04	.11522E-03	.6834
.950	1.6228	.29870E-04	.11253E-03	.6831
1.000	1.6306	.29309E-04	.10980E-03	.6833
1.050	1.6374	.28739E-04	.10705E-03	.6838
1.100	1.6389	.28162E-04	.10430E-03	.6847
1.150	1.6468	.27580E-04	.10155E-03	.6860
1.200	1.6471	.26996E-04	.98690E-04	.6885
1.250	1.6508	.26412E-04	.96182E-04	.6891
1.300	1.6570	.25829E-04	.93709E-04	.6899
1.350	1.6561	.25250E-04	.91278E-04	.6908
1.400	1.6614	.24676E-04	.88895E-04	.6919
1.450	1.6601	.24107E-04	.86562E-04	.6931
1.500	1.6647	.23544E-04	.84273E-04	.6944
1.550	1.6613	.22990E-04	.82023E-04	.6960
1.600	1.6664	.22443E-04	.79792E-04	.6978
1.650	1.6665	.21906E-04	.77677E-04	.6992
1.700	1.6651	.21377E-04	.75622E-04	.7005
1.750	1.6656	.20858E-04	.73625E-04	.7018
1.800	1.6663	.20348E-04	.71686E-04	.7029
1.850	1.6670	.19849E-04	.69804E-04	.7040
1.900	1.6697	.19360E-04	.67978E-04	.7050
1.950	1.6660	.18880E-04	.66191E-04	.7060
2.000	1.6672	.18411E-04	.64469E-04	.7067

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

P. TT = 100.0 K PT = 1.0 ATM RHOT = .246E-03 G/CM3 SVT = 772.508 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9997	1.4478	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.225E+07	.9997	1.4480	.9998	.9982	.9994	.9987	.0857	1.0000	.9999	.9999	1.0000	.9931
.100	.448E+07	.9997	1.4487	.9992	.9928	.9978	.9950	.1706	1.0002	.9998	.9998	1.0000	.9933
.150	.669E+07	.9997	1.4499	.9982	.9838	.9950	.9888	.2540	1.0004	.9994	.9995	.9999	.9934
.200	.886E+07	.9997	1.4515	.9968	.9716	.9911	.9803	.3354	1.0008	.9991	.9990	1.0000	.9939
.250	.110E+08	.9997	1.4536	.9950	.9560	.9861	.9694	.4138	1.0012	.9984	.9985	1.0000	.9943
.300	.130E+08	.9997	1.4562	.9928	.9372	.9801	.9563	.4887	1.0017	.9975	.9977	.9999	.9946
.350	.150E+08	.9997	1.4593	.9902	.9157	.9730	.9412	.5598	1.0023	.9966	.9968	.9999	.9953
.400	.169E+08	.9996	1.4629	.9873	.8915	.9648	.9241	.6262	1.0029	.9954	.9957	.9998	.9958
.450	.186E+08	.9996	1.4671	.9839	.8649	.9556	.9052	.6878	1.0037	.9939	.9943	.9996	.9963
.500	.203E+08	.9996	1.4717	.9802	.8364	.9455	.8847	.7441	1.0044	.9921	.9927	.9995	.9970
.550	.219E+08	.9996	1.4769	.9761	.8060	.9347	.8628	.7948	1.0052	.9899	.9908	.9992	.9975
.600	.234E+08	.9995	1.4827	.9716	.7741	.9232	.8396	.8399	1.0060	.9874	.9886	.9989	.9980
.650	.247E+08	.9995	1.4891	.9668	.7412	.9093	.8153	.8792	1.0068	.9845	.9861	.9986	.9985
.700	.260E+08	.9995	1.4960	.9616	.7075	.8954	.7903	.9129	1.0076	.9813	.9831	.9984	.9991
.750	.271E+08	.9994	1.5034	.9560	.6731	.8807	.7644	.9406	1.0084	.9775	.9798	.9979	.9993
.800	.281E+08	.9994	1.5114	.9501	.6385	.8653	.7382	.9628	1.0091	.9733	.9760	.9975	.9996
.850	.290E+08	.9994	1.5198	.9438	.6040	.8491	.7116	.9795	1.0097	.9687	.9718	.9971	.9998
.900	.297E+08	.9993	1.5288	.9371	.5698	.8323	.6849	.9912	1.0101	.9637	.9671	.9969	1.0000
.950	.304E+08	.9993	1.5381	.9300	.5361	.8149	.6582	.9979	1.0105	.9583	.9620	.9966	1.0000
1.000	.310E+08	.9993	1.5477	.9226	.5032	.7970	.6316	1.0000	1.0106	.9525	.9564	.9964	1.0000
1.050	.315E+08	.9992	1.5575	.9148	.4712	.7786	.6055	.9979	1.0106	.9464	.9503	.9964	1.0000
1.100	.319E+08	.9992	1.5674	.9066	.4404	.7600	.5799	.9923	1.0103	.9404	.9439	.9969	1.0002
1.150	.322E+08	.9992	1.5773	.8980	.4108	.7410	.5547	.9831	1.0098	.9341	.9370	.9974	1.0002
1.200	.324E+08	.9991	1.5870	.8891	.3827	.7220	.5304	.9711	1.0090	.9281	.9299	.9986	1.0006
1.250	.326E+08	.9991	1.5964	.8798	.3560	.7029	.5068	.9564	1.0079	.9221	.9225	1.0002	1.0011
1.300	.327E+08	.9991	1.6054	.8702	.3308	.6838	.4841	.9397	1.0066	.9165	.9149	1.0024	1.0020
1.350	.327E+08	.9990	1.6138	.8603	.3071	.6649	.4622	.9212	1.0049	.9114	.9072	1.0053	1.0032
1.400	.327E+08	.9990	1.6216	.8501	.2850	.6462	.4413	.9013	1.0030	.9068	.8995	1.0088	1.0049
1.450	.327E+08	.9990	1.6288	.8398	.2643	.6278	.4213	.8804	1.0009	.9030	.8918	1.0133	1.0072
1.500	.326E+08	.9990	1.6352	.8292	.2451	.6098	.4023	.8586	.9985	.8998	.8842	1.0184	1.0099
1.550	.325E+08	.9989	1.6408	.8186	.2273	.5922	.3841	.8363	.9960	.8974	.8767	1.0244	1.0133
1.600	.324E+08	.9989	1.6458	.8078	.2108	.5750	.3669	.8138	.9933	.8960	.8694	1.0315	1.0175
1.650	.322E+08	.9989	1.6501	.7970	.1955	.5583	.3505	.7910	.9905	.8953	.8623	1.0391	1.0221
1.700	.320E+08	.9989	1.6537	.7862	.1814	.5421	.3349	.7682	.9876	.8954	.8554	1.0477	1.0275
1.750	.318E+08	.9989	1.6568	.7754	.1684	.5263	.3202	.7456	.9846	.8964	.8487	1.0572	1.0337
1.800	.316E+08	.9988	1.6594	.7647	.1563	.5111	.3061	.7231	.9816	.8982	.8423	1.0673	1.0405
1.850	.314E+08	.9988	1.6615	.7540	.1452	.4963	.2928	.7010	.9786	.9009	.8361	1.0785	1.0481
1.900	.311E+08	.9988	1.6632	.7435	.1349	.4821	.2802	.6791	.9756	.9041	.8301	1.0902	1.0562
1.950	.309E+08	.9988	1.6646	.7330	.1254	.4683	.2681	.6577	.9726	.9082	.8244	1.1027	1.0651
2.000	.306E+08	.9988	1.6657	.7227	.1167	.4549	.2567	.6367	.9697	.9128	.8188	1.1157	1.0744

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.42160E-04	.19153E-03	.7065
.050	1.4467	.42143E-04	.19140E-03	.7064
.100	1.4516	.42092E-04	.19100E-03	.7063
.150	1.4412	.42008E-04	.19034E-03	.7060
.200	1.4578	.41889E-04	.18941E-03	.7057
.250	1.4518	.41738E-04	.18823E-03	.7053
.300	1.4508	.41552E-04	.18678E-03	.7048
.350	1.4599	.41334E-04	.18509E-03	.7042
.400	1.4609	.41083E-04	.18314E-03	.7035
.450	1.4627	.40799E-04	.18095E-03	.7028
.500	1.4697	.40484E-04	.17853E-03	.7020
.550	1.4729	.40136E-04	.17587E-03	.7012
.600	1.4784	.39758E-04	.17299E-03	.7004
.650	1.4851	.39349E-04	.16989E-03	.6996
.700	1.4942	.38910E-04	.16659E-03	.6989
.750	1.4969	.38442E-04	.16317E-03	.6979
.800	1.5068	.37946E-04	.15964E-03	.6968
.850	1.5144	.37423E-04	.15595E-03	.6958
.900	1.5247	.36875E-04	.15211E-03	.6951
.950	1.5322	.36302E-04	.14813E-03	.6946
1.000	1.5410	.35708E-04	.14404E-03	.6946
1.050	1.5506	.35093E-04	.13985E-03	.6950
1.100	1.5634	.34461E-04	.13634E-03	.6922
1.150	1.5697	.33814E-04	.13282E-03	.6895
1.200	1.5820	.33156E-04	.12928E-03	.6873
1.250	1.5898	.32488E-04	.12572E-03	.6856
1.300	1.5992	.31815E-04	.12216E-03	.6844
1.350	1.6080	.31140E-04	.11867E-03	.6837
1.400	1.6157	.30464E-04	.11531E-03	.6829
1.450	1.6249	.29791E-04	.11201E-03	.6827
1.500	1.6293	.29124E-04	.10876E-03	.6830
1.550	1.6360	.28463E-04	.10560E-03	.6838
1.600	1.6433	.27812E-04	.10250E-03	.6850
1.650	1.6449	.27170E-04	.99497E-04	.6867
1.700	1.6493	.26539E-04	.96642E-04	.6882
1.750	1.6541	.25921E-04	.94009E-04	.6890
1.800	1.6555	.25314E-04	.91460E-04	.6899
1.850	1.6604	.24719E-04	.88992E-04	.6911
1.900	1.6598	.24137E-04	.86605E-04	.6923
1.950	1.6624	.23568E-04	.84290E-04	.6937
2.000	1.6615	.23012E-04	.82036E-04	.6952

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. TT = 200.0 K PT = 1.0 ATM RHOT = .123E-03 G/CM3 SVT =1054.285 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0007	1.3458	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.948E+06	1.0007	1.3457	.9998	.9982	.9996	.9986	.0659	1.0000	.9999	1.0001	.9999	.9951
.100	.189E+07	1.0007	1.3456	.9991	.9933	.9983	.9950	.1710	1.0001	1.0003	1.0003	1.0000	.9953
.150	.282E+07	1.0007	1.3454	.9979	.9850	.9961	.9886	.2545	1.0002	1.0006	1.0006	1.0000	.9954
.200	.373E+07	1.0007	1.3452	.9963	.9735	.9931	.9803	.3359	1.0003	1.0011	1.0011	1.0000	.9955
.250	.461E+07	1.0007	1.3449	.9943	.9589	.9893	.9693	.4143	1.0005	1.0015	1.0017	.9998	.9955
.300	.546E+07	1.0006	1.3445	.9918	.9416	.9847	.9562	.4893	1.0007	1.0022	1.0024	.9998	.9957
.350	.627E+07	1.0006	1.3440	.9889	.9218	.9793	.9413	.5603	1.0010	1.0033	1.0033	1.0000	.9962
.400	.705E+07	1.0006	1.3435	.9856	.8993	.9732	.9242	.6266	1.0013	1.0042	1.0043	.9999	.9963
.450	.777E+07	1.0006	1.3430	.9819	.8747	.9663	.9052	.6879	1.0016	1.0051	1.0055	.9997	.9965
.500	.845E+07	1.0006	1.3424	.9779	.8483	.9588	.8848	.7440	1.0020	1.0063	1.0068	.9996	.9969
.550	.908E+07	1.0006	1.3418	.9735	.8204	.9507	.8631	.7947	1.0025	1.0076	1.0082	.9996	.9973
.600	.965E+07	1.0005	1.3412	.9687	.7910	.9419	.8399	.8395	1.0030	1.0089	1.0097	.9993	.9975
.650	.102E+08	1.0005	1.3406	.9637	.7607	.9326	.8158	.8788	1.0036	1.0104	1.0114	.9993	.9980
.700	.106E+08	1.0005	1.3400	.9584	.7294	.9227	.7907	.9122	1.0042	1.0118	1.0131	.9989	.9983
.750	.110E+08	1.0005	1.3395	.9527	.6978	.9124	.7650	.9401	1.0049	1.0135	1.0150	.9987	.9988
.800	.114E+08	1.0005	1.3389	.9469	.6660	.9016	.7388	.9625	1.0057	1.0152	1.0170	.9984	.9993
.850	.117E+08	1.0004	1.3384	.9408	.6339	.8904	.7121	.9793	1.0065	1.0166	1.0191	.9979	.9995
.900	.119E+08	1.0004	1.3380	.9345	.6020	.8789	.6852	.9911	1.0074	1.0182	1.0212	.9973	.9998
.950	.121E+08	1.0004	1.3377	.9280	.5704	.8670	.6581	.9978	1.0083	1.0196	1.0235	.9969	1.0000
1.000	.123E+08	1.0004	1.3374	.9214	.5393	.8548	.6311	1.0000	1.0094	1.0209	1.0258	.9955	1.0000
1.050	.124E+08	1.0003	1.3373	.9146	.5088	.8424	.6042	.9978	1.0104	1.0219	1.0281	.9943	.9999
1.100	.124E+08	1.0003	1.3374	.9077	.4790	.8297	.5776	.9917	1.0116	1.0227	1.0305	.9929	.9995
1.150	.124E+08	1.0003	1.3376	.9007	.4502	.8168	.5514	.9822	1.0126	1.0236	1.0328	.9914	.9993
1.200	.124E+08	1.0003	1.3380	.8935	.4223	.8037	.5257	.9697	1.0141	1.0241	1.0352	.9897	.9988
1.250	.124E+08	1.0003	1.3385	.8863	.3954	.7905	.5004	.9534	1.0154	1.0242	1.0375	.9876	.9980
1.300	.123E+08	1.0002	1.3393	.8790	.3697	.7771	.4759	.9352	1.0168	1.0242	1.0398	.9855	.9972
1.350	.121E+08	1.0002	1.3404	.8717	.3450	.7636	.4520	.9147	1.0183	1.0238	1.0420	.9830	.9962
1.400	.120E+08	1.0002	1.3417	.8643	.3215	.7501	.4288	.8924	1.0198	1.0231	1.0441	.9804	.9950
1.450	.118E+08	1.0002	1.3433	.8569	.2991	.7364	.4064	.8684	1.0213	1.0218	1.0460	.9774	.9934
1.500	.116E+08	1.0002	1.3453	.8495	.2779	.7226	.3847	.8431	1.0229	1.0201	1.0478	.9741	.9916
1.550	.114E+08	1.0002	1.3476	.8420	.2577	.7088	.3638	.8166	1.0246	1.0177	1.0494	.9703	.9893
1.600	.112E+08	1.0001	1.3503	.8346	.2388	.6949	.3438	.7894	1.0262	1.0148	1.0507	.9664	.9869
1.650	.109E+08	1.0001	1.3534	.8271	.2209	.6810	.3245	.7616	1.0279	1.0114	1.0518	.9621	.9842
1.700	.107E+08	1.0001	1.3570	.8197	.2041	.6670	.3062	.7336	1.0297	1.0074	1.0526	.9577	.9813
1.750	.104E+08	1.0001	1.3611	.8122	.1884	.6531	.2886	.7055	1.0314	1.0030	1.0530	.9530	.9782
1.800	.102E+08	1.0001	1.3656	.8048	.1736	.6390	.2719	.6774	1.0331	.9978	1.0531	.9480	.9747
1.850	.991E+07	1.0001	1.3707	.7974	.1599	.6250	.2559	.6492	1.0349	.9917	1.0528	.9425	.9707
1.900	.964E+07	1.0001	1.3764	.7900	.1470	.6109	.2408	.6216	1.0366	.9853	1.0520	.9372	.9668
1.950	.937E+07	1.0001	1.3827	.7826	.1351	.5968	.2265	.5943	1.0384	.9780	1.0507	.9313	.9624
2.000	.910E+07	1.0001	1.3896	.7752	.1240	.5827	.2129	.5676	1.0401	.9701	1.0490	.9254	.9578

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.68161E-04	.37298E-03	.7022
.050	1.3157	.68141E-04	.37290E-03	.7022
.100	1.3601	.68081E-04	.37266E-03	.7022
.150	1.3462	.67981E-04	.37225E-03	.7022
.200	1.3461	.67842E-04	.37169E-03	.7022
.250	1.3417	.67665E-04	.37096E-03	.7022
.300	1.3456	.67450E-04	.37009E-03	.7022
.350	1.3498	.67199E-04	.36907E-03	.7022
.400	1.3431	.66912E-04	.36791E-03	.7022
.450	1.3415	.66591E-04	.36662E-03	.7021
.500	1.3441	.66238E-04	.36520E-03	.7019
.550	1.3436	.65853E-04	.36365E-03	.7017
.600	1.3412	.65439E-04	.36172E-03	.7019
.650	1.3438	.64996E-04	.35894E-03	.7035
.700	1.3401	.64526E-04	.35600E-03	.7050
.750	1.3417	.64033E-04	.35293E-03	.7066
.800	1.3417	.63515E-04	.34972E-03	.7082
.850	1.3391	.62976E-04	.34639E-03	.7096
.900	1.3400	.62416E-04	.34295E-03	.7110
.950	1.3383	.61838E-04	.33941E-03	.7123
1.000	1.3375	.61243E-04	.33579E-03	.7134
1.050	1.3373	.60631E-04	.33208E-03	.7143
1.100	1.3368	.60003E-04	.32830E-03	.7150
1.150	1.3384	.59362E-04	.32446E-03	.7154
1.200	1.3375	.58709E-04	.32057E-03	.7155
1.250	1.3378	.58042E-04	.31663E-03	.7152
1.300	1.3400	.57364E-04	.31265E-03	.7146
1.350	1.3407	.56677E-04	.30863E-03	.7135
1.400	1.3415	.55980E-04	.30459E-03	.7120
1.450	1.3426	.55273E-04	.30052E-03	.7100
1.500	1.3444	.54557E-04	.29642E-03	.7075
1.550	1.3456	.53832E-04	.28994E-03	.7102
1.600	1.3490	.53099E-04	.28337E-03	.7126
1.650	1.3518	.52357E-04	.27677E-03	.7147
1.700	1.3557	.51608E-04	.27015E-03	.7164
1.750	1.3600	.50851E-04	.26352E-03	.7176
1.800	1.3636	.50086E-04	.25688E-03	.7184
1.850	1.3673	.49312E-04	.25022E-03	.7189
1.900	1.3747	.48531E-04	.24356E-03	.7188
1.950	1.3793	.47742E-04	.23688E-03	.7183
2.000	1.3860	.46945E-04	.23021E-03	.7174

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. TT = 300.0 K PT = 1.0 ATM RHOT = .818E-04 G/CM3 SVT =1309.789 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0006	1.3697	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.597E+06	1.0006	1.3849	.9997	.9982	.9995	.9987	.0863	1.0000	.9999	1.0000	.9999	1.0004
.100	.119E+07	1.0006	1.3848	.9990	.9931	.9981	.9950	.1716	1.0000	1.0000	1.0001	1.0000	1.0004
.150	.178E+07	1.0006	1.3846	.9977	.9845	.9957	.9888	.2558	1.0000	1.0001	1.0002	.9999	1.0004
.200	.235E+07	1.0006	1.3844	.9960	.9728	.9924	.9803	.3376	.9999	1.0003	1.0003	1.0000	1.0004
.250	.290E+07	1.0006	1.3840	.9937	.9579	.9881	.9694	.4164	.9999	1.0005	1.0005	1.0000	1.0004
.300	.344E+07	1.0006	1.3837	.9910	.9401	.9830	.9564	.4915	.9999	1.0007	1.0007	1.0000	1.0003
.350	.395E+07	1.0006	1.3832	.9878	.9196	.9770	.9413	.5626	.9998	1.0009	1.0010	1.0000	1.0002
.400	.444E+07	1.0006	1.3827	.9842	.8966	.9702	.9242	.6290	.9998	1.0012	1.0013	.9999	1.0002
.450	.490E+07	1.0006	1.3821	.9801	.8718	.9626	.9056	.6905	.9997	1.0017	1.0016	1.0001	1.0003
.500	.533E+07	1.0005	1.3814	.9756	.8447	.9543	.8851	.7464	.9997	1.0019	1.0021	1.0000	1.0001
.550	.573E+07	1.0005	1.3806	.9707	.8161	.9453	.8634	.7968	.9996	1.0024	1.0025	.9999	1.0000
.600	.609E+07	1.0005	1.3797	.9654	.7863	.9357	.8404	.8416	.9996	1.0030	1.0031	1.0000	1.0000
.650	.642E+07	1.0005	1.3788	.9598	.7556	.9255	.8165	.8806	.9995	1.0036	1.0037	1.0001	1.0000
.700	.671E+07	1.0005	1.3778	.9538	.7240	.9147	.7916	.9137	.9995	1.0042	1.0044	1.0000	.9999
.750	.697E+07	1.0005	1.3767	.9475	.6919	.9035	.7659	.9409	.9994	1.0048	1.0051	.9998	.9997
.800	.720E+07	1.0004	1.3754	.9410	.6598	.8918	.7399	.9629	.9994	1.0057	1.0060	.9999	.9997
.850	.739E+07	1.0004	1.3741	.9341	.6277	.8798	.7136	.9795	.9993	1.0066	1.0069	.9999	.9997
.900	.755E+07	1.0004	1.3727	.9270	.5959	.8674	.6872	.9912	.9993	1.0079	1.0079	1.0002	1.0000
.950	.767E+07	1.0004	1.3712	.9197	.5644	.8548	.6605	.9977	.9993	1.0089	1.0090	1.0001	.9999
1.000	.777E+07	1.0004	1.3697	.9123	.5337	.8419	.6341	1.0000	.9993	1.0102	1.0103	1.0002	1.0000
1.050	.784E+07	1.0004	1.3680	.9046	.5037	.8288	.6078	.9981	.9994	1.0116	1.0116	1.0003	1.0001
1.100	.788E+07	1.0003	1.3663	.8968	.4744	.8156	.5818	.9921	.9994	1.0128	1.0130	1.0001	1.0000
1.150	.789E+07	1.0003	1.3645	.8888	.4461	.8023	.5561	.9827	.9995	1.0142	1.0145	.9999	.9999
1.200	.788E+07	1.0003	1.3627	.8808	.4188	.7890	.5310	.9704	.9996	1.0157	1.0162	.9998	.9999
1.250	.785E+07	1.0003	1.3608	.8727	.3927	.7756	.5065	.9552	.9998	1.0173	1.0179	.9997	.9999
1.300	.779E+07	1.0003	1.3589	.8645	.3677	.7622	.4826	.9376	1.0000	1.0188	1.0198	.9994	.9998
1.350	.772E+07	1.0003	1.3570	.8562	.3438	.7488	.4593	.9178	1.0002	1.0202	1.0217	.9989	.9995
1.400	.763E+07	1.0002	1.3550	.8480	.3211	.7355	.4367	.8963	1.0005	1.0218	1.0238	.9984	.9993
1.450	.753E+07	1.0002	1.3531	.8397	.2995	.7222	.4148	.8732	1.0008	1.0231	1.0259	.9976	.9989
1.500	.741E+07	1.0002	1.3512	.8314	.2791	.7091	.3938	.8490	1.0012	1.0246	1.0282	.9969	.9985
1.550	.728E+07	1.0002	1.3494	.8232	.2598	.6960	.3733	.8235	1.0016	1.0256	1.0305	.9957	.9978
1.600	.714E+07	1.0002	1.3476	.8149	.2416	.6831	.3538	.7975	1.0021	1.0268	1.0328	.9945	.9971
1.650	.699E+07	1.0002	1.3459	.8067	.2245	.6703	.3358	.7710	1.0026	1.0279	1.0353	.9933	.9963
1.700	.683E+07	1.0002	1.3442	.7986	.2084	.6576	.3178	.7440	1.0032	1.0285	1.0377	.9916	.9952
1.750	.667E+07	1.0002	1.3428	.7905	.1933	.6451	.2998	.7169	1.0038	1.0291	1.0402	.9898	.9940
1.800	.650E+07	1.0001	1.3414	.7825	.1791	.6327	.2833	.6897	1.0045	1.0293	1.0428	.9876	.9925
1.850	.633E+07	1.0001	1.3402	.7745	.1659	.6205	.2675	.6627	1.0053	1.0294	1.0453	.9853	.9909
1.900	.616E+07	1.0001	1.3392	.7667	.1536	.6085	.2525	.6359	1.0061	1.0290	1.0477	.9826	.9890
1.950	.598E+07	1.0001	1.3383	.7589	.1420	.5965	.2382	.6095	1.0069	1.0283	1.0502	.9797	.9869
2.000	.581E+07	1.0001	1.3377	.7512	.1313	.5848	.2245	.5835	1.0078	1.0273	1.0526	.9765	.9846

TABLE I. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.89603E-04	.46141E-03	.7096
.050	1.3616	.89583E-04	.46128E-03	.6893
.100	1.3898	.89496E-04	.46090E-03	.6893
.150	1.3845	.89352E-04	.46026E-03	.6893
.200	1.3885	.89151E-04	.45938E-03	.6894
.250	1.3847	.88894E-04	.45825E-03	.6895
.300	1.3839	.88583E-04	.45688E-03	.6897
.350	1.3834	.88219E-04	.45529E-03	.6898
.400	1.3830	.87805E-04	.45348E-03	.6900
.450	1.3868	.87342E-04	.45147E-03	.6903
.500	1.3794	.86833E-04	.44925E-03	.6905
.550	1.3808	.86280E-04	.44686E-03	.6908
.600	1.3814	.85686E-04	.44429E-03	.6911
.650	1.3806	.85053E-04	.44159E-03	.6915
.700	1.3774	.84385E-04	.43886E-03	.6916
.750	1.3756	.83684E-04	.43602E-03	.6919
.800	1.3775	.82954E-04	.43307E-03	.6921
.850	1.3753	.82196E-04	.43002E-03	.6924
.900	1.3762	.81414E-04	.42689E-03	.6928
.950	1.3715	.80611E-04	.42368E-03	.6931
1.000	1.3721	.79790E-04	.42042E-03	.6935
1.050	1.3705	.78952E-04	.41712E-03	.6939
1.100	1.3665	.78100E-04	.41377E-03	.6943
1.150	1.3651	.77238E-04	.41041E-03	.6948
1.200	1.3644	.76366E-04	.40702E-03	.6952
1.250	1.3627	.75487E-04	.40356E-03	.6957
1.300	1.3603	.74603E-04	.39978E-03	.6960
1.350	1.3574	.73715E-04	.39599E-03	.6979
1.400	1.3568	.72825E-04	.39223E-03	.6988
1.450	1.3535	.71934E-04	.38848E-03	.6997
1.500	1.3531	.71044E-04	.38476E-03	.7005
1.550	1.3497	.70154E-04	.38107E-03	.7011
1.600	1.3467	.69268E-04	.37741E-03	.7016
1.650	1.3477	.68384E-04	.37379E-03	.7020
1.700	1.3445	.67504E-04	.37021E-03	.7021
1.750	1.3443	.66628E-04	.36666E-03	.7020
1.800	1.3418	.65756E-04	.36316E-03	.7015
1.850	1.3420	.64888E-04	.35822E-03	.7037
1.900	1.3402	.64026E-04	.35284E-03	.7065
1.950	1.3396	.63168E-04	.34752E-03	.7090
2.000	1.3394	.62314E-04	.34227E-03	.7112

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. TT = 30.0 K PT = 3.0 ATM RHOT = .275E-02 G/CM3 SVT = 433.065 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.8930	1.9215	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.357E+08	.8929	1.9215	.9995	.9979	.9991	.9988	.0892	.9998	.9996	.9996	1.0000	1.0341
.100	.712E+08	.8929	1.9214	.9982	.9915	.9966	.9950	.1775	.9992	.9985	.9986	1.0000	1.0334
.150	.106E+09	.8928	1.9214	.9960	.9811	.9924	.9888	.2640	.9982	.9967	.9968	1.0000	1.0324
.200	.141E+09	.8927	1.9214	.9928	.9670	.9865	.9804	.3479	.9968	.9943	.9944	1.0002	1.0311
.250	.175E+09	.8926	1.9213	.9889	.9489	.9791	.9696	.4284	.9950	.9911	.9913	1.0001	1.0293
.300	.208E+09	.8925	1.9211	.9841	.9276	.9702	.9566	.5048	.9929	.9873	.9876	1.0003	1.0272
.350	.240E+09	.8923	1.9210	.9786	.9033	.9599	.9418	.5765	.9905	.9832	.9834	1.0006	1.0250
.400	.270E+09	.8921	1.9208	.9723	.8765	.9482	.9252	.6431	.9877	.9786	.9786	1.0010	1.0226
.450	.300E+09	.8919	1.9205	.9653	.8474	.9354	.9069	.7041	.9847	.9737	.9733	1.0016	1.0200
.500	.328E+09	.8917	1.9202	.9577	.8164	.9215	.8872	.7593	.9814	.9685	.9676	1.0023	1.0174
.550	.355E+09	.8915	1.9198	.9495	.7841	.9066	.8662	.8085	.9778	.9630	.9615	1.0032	1.0146
.600	.380E+09	.8913	1.9193	.9408	.7509	.8909	.8444	.8519	.9741	.9577	.9551	1.0047	1.0122
.650	.404E+09	.8911	1.9187	.9316	.7168	.8744	.8215	.8891	.9702	.9522	.9483	1.0062	1.0096
.700	.427E+09	.8909	1.9180	.9220	.6827	.8574	.7981	.9206	.9661	.9469	.9414	1.0082	1.0074
.750	.448E+09	.8907	1.9171	.9119	.6483	.8398	.7740	.9461	.9619	.9416	.9343	1.0104	1.0052
.800	.467E+09	.8905	1.9161	.9016	.6145	.8218	.7498	.9665	.9576	.9367	.9270	1.0132	1.0035
.850	.485E+09	.8903	1.9151	.8910	.5811	.8036	.7253	.9817	.9532	.9320	.9197	1.0164	1.0020
.900	.502E+09	.8902	1.9139	.8801	.5485	.7851	.7008	.9921	.9487	.9277	.9123	1.0200	1.0009
.950	.517E+09	.8900	1.9127	.8691	.5169	.7666	.6764	.9982	.9443	.9239	.9050	1.0242	1.0003
1.000	.531E+09	.8899	1.9113	.8579	.4862	.7480	.6522	1.0000	.9398	.9203	.8976	1.0288	1.0000
1.050	.543E+09	.8897	1.9100	.8466	.4567	.7295	.6293	.9983	.9353	.9174	.8904	1.0340	1.0003
1.100	.555E+09	.8896	1.9087	.8353	.4285	.7111	.6048	.9932	.9309	.9149	.8832	1.0398	1.0011

SATURATION BOUNDARY REACHED.

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.16676E-04	.61100E-04	.8029
.050	1.6971	.16662E-04	.61049E-04	.8029
.100	1.6918	.16622E-04	.60897E-04	.8030
.150	1.6954	.16555E-04	.60644E-04	.8031
.200	1.7087	.16463E-04	.60295E-04	.8032
.250	1.6890	.16345E-04	.59847E-04	.8034
.300	1.6941	.16203E-04	.59306E-04	.8037
.350	1.6970	.16036E-04	.58680E-04	.8041
.400	1.6965	.15853E-04	.57988E-04	.8043
.450	1.6929	.15647E-04	.57215E-04	.8046
.500	1.6927	.15423E-04	.56369E-04	.8051
.550	1.6887	.15183E-04	.55453E-04	.8058
.600	1.6947	.14928E-04	.54476E-04	.8066
.650	1.6872	.14659E-04	.53442E-04	.8077
.700	1.6903	.14380E-04	.52455E-04	.8076
.750	1.6822	.14091E-04	.51429E-04	.8076
.800	1.6863	.13794E-04	.50340E-04	.8084
.850	1.6833	.13491E-04	.49191E-04	.8099
.900	1.6805	.13183E-04	.47990E-04	.8123
.950	1.6805	.12872E-04	.46745E-04	.8155
1.000	1.6757	.12558E-04	.45460E-04	.8197
1.050	1.6762	.12244E-04	.44147E-04	.8249
1.100	1.6738	.11931E-04	.42977E-04	.8288

SATURATION BOUNDARY REACHED.

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. TT = 35.0 K PT = 3.0 ATM RHOT = .226E-02 G/CM3 SVT = 477.003 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9310	1.8249	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.284E+08	.9310	1.8248	.9996	.9979	.9991	.9987	.0691	.9998	.9996	.9996	1.0000	1.0329
.100	.567E+08	.9310	1.8248	.9982	.9917	.9966	.9951	.1773	.9992	.9987	.9986	1.0001	1.0324
.150	.847E+08	.9309	1.8247	.9960	.9813	.9924	.9869	.2638	.9982	.9966	.9969	1.0001	1.0314
.200	.112E+09	.9308	1.8245	.9929	.9670	.9866	.9804	.3475	.9969	.9943	.9944	1.0001	1.0300
.250	.139E+09	.9307	1.8243	.9890	.9491	.9792	.9696	.4280	.9951	.9912	.9914	1.0002	1.0283
.300	.165E+09	.9306	1.8240	.9842	.9277	.9703	.9566	.5043	.9931	.9875	.9877	1.0003	1.0262
.350	.191E+09	.9304	1.8237	.9787	.9035	.9600	.9417	.5759	.9907	.9834	.9835	1.0005	1.0240
.400	.215E+09	.9303	1.8234	.9725	.8768	.9484	.9253	.6426	.9880	.9790	.9787	1.0011	1.0218
.450	.238E+09	.9301	1.8233	.9657	.8477	.9356	.9069	.7036	.9851	.9740	.9735	1.0015	1.0193
.500	.261E+09	.9299	1.8230	.9582	.8168	.9217	.8872	.7588	.9819	.9689	.9678	1.0023	1.0167
.550	.282E+09	.9297	1.8228	.9502	.7844	.9068	.8661	.8080	.9785	.9634	.9617	1.0031	1.0141
.600	.302E+09	.9296	1.8225	.9416	.7510	.8911	.8441	.8514	.9749	.9579	.9553	1.0044	1.0116
.650	.320E+09	.9294	1.8222	.9325	.7170	.8746	.8212	.8887	.9711	.9524	.9486	1.0059	1.0092
.700	.338E+09	.9292	1.8219	.9231	.6828	.8576	.7978	.9203	.9672	.9472	.9416	1.0079	1.0072
.750	.354E+09	.9290	1.8216	.9132	.6485	.8399	.7738	.9461	.9632	.9418	.9344	1.0101	1.0052
.800	.369E+09	.9288	1.8211	.9030	.6144	.8219	.7493	.9664	.9591	.9366	.9271	1.0126	1.0033
.850	.383E+09	.9287	1.8207	.8926	.5809	.8035	.7248	.9816	.9549	.9316	.9196	1.0156	1.0019
.900	.396E+09	.9285	1.8202	.8819	.5481	.7849	.7002	.9920	.9506	.9270	.9121	1.0191	1.0008
.950	.408E+09	.9284	1.8196	.8710	.5163	.7662	.6757	.9981	.9463	.9226	.9045	1.0231	1.0003
1.000	.419E+09	.9283	1.8190	.8599	.4855	.7475	.6514	1.0000	.9420	.9189	.8970	1.0275	1.0000
1.050	.428E+09	.9281	1.8183	.8488	.4558	.7287	.6274	.9983	.9377	.9156	.8894	1.0326	1.0003
1.100	.437E+09	.9280	1.8176	.8376	.4274	.7101	.6039	.9932	.9334	.9126	.8819	1.0381	1.0011
1.150	.445E+09	.9280	1.8168	.8263	.4003	.6916	.5806	.9850	.9291	.9100	.8745	1.0440	1.0022
1.200	.452E+09	.9279	1.8159	.8150	.3745	.6733	.5580	.9743	.9249	.9081	.8672	1.0506	1.0039
1.250	.458E+09	.9278	1.8151	.8037	.3501	.6553	.5360	.9614	.9207	.9068	.8601	1.0579	1.0063
1.300	.463E+09	.9278	1.8142	.7924	.3270	.6375	.5146	.9464	.9166	.9059	.8530	1.0657	1.0092
1.350	.468E+09	.9278	1.8133	.7813	.3051	.6201	.4938	.9298	.9126	.9056	.8461	1.0740	1.0126
1.400	.472E+09	.9278	1.8124	.7701	.2846	.6030	.4736	.9116	.9086	.9056	.8393	1.0827	1.0163
1.450	.475E+09	.9277	1.8116	.7591	.2653	.5863	.4542	.8924	.9048	.9064	.8328	1.0922	1.0209
1.500	.478E+09	.9277	1.8108	.7482	.2472	.5699	.4353	.8722	.9010	.9076	.8264	1.1021	1.0259
1.550	.480E+09	.9277	1.8101	.7374	.2303	.5540	.4173	.8514	.8973	.9095	.8201	1.1128	1.0316

SATURATION BOUNDARY REACHED.

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.18949E-04	.68541E-04	.7620
.050	1.6895	.18934E-04	.68483E-04	.7620
.100	1.7153	.18891E-04	.68314E-04	.7621
.150	1.6882	.18818E-04	.68030E-04	.7624
.200	1.6879	.18718E-04	.67637E-04	.7627
.250	1.6922	.18590E-04	.67136E-04	.7631
.300	1.6874	.18437E-04	.66537E-04	.7636
.350	1.6902	.18258E-04	.65842E-04	.7641
.400	1.6976	.18057E-04	.65080E-04	.7646
.450	1.6868	.17833E-04	.64236E-04	.7650
.500	1.6886	.17590E-04	.63318E-04	.7653
.550	1.6857	.17328E-04	.62367E-04	.7653
.600	1.6873	.17049E-04	.61349E-04	.7653
.650	1.6864	.16756E-04	.60267E-04	.7655
.700	1.6904	.16450E-04	.59130E-04	.7659
.750	1.6846	.16132E-04	.57938E-04	.7664
.800	1.6822	.15806E-04	.56703E-04	.7670
.850	1.6828	.15471E-04	.55430E-04	.7679
.900	1.6817	.15130E-04	.54127E-04	.7689
.950	1.6830	.14786E-04	.52801E-04	.7701
1.000	1.6795	.14437E-04	.51457E-04	.7716
1.050	1.6810	.14087E-04	.50130E-04	.7728
1.100	1.6790	.13737E-04	.48861E-04	.7732
1.150	1.6752	.13386E-04	.47594E-04	.7737
1.200	1.6763	.13038E-04	.46329E-04	.7744
1.250	1.6773	.12692E-04	.45071E-04	.7753
1.300	1.6747	.12349E-04	.43823E-04	.7763
1.350	1.6733	.12011E-04	.42588E-04	.7776
1.400	1.6684	.11676E-04	.41370E-04	.7790
1.450	1.6724	.11348E-04	.40172E-04	.7806
1.500	1.6676	.11025E-04	.39021E-04	.7819
1.550	1.6702	.10708E-04	.38143E-04	.7783

SATURATION BOUNDARY REACHED.

TAPLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. TT = 40.0 K PT = 3.0 ATM RHOT = .193E-02 G/CM3 SVT = 515.384 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9528	1.7759	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.236E+08	.9528	1.7759	.9996	.9979	.9992	.9987	.0896	.9998	.9996	.9997	1.0000	1.0323
.100	.470E+08	.9527	1.7759	.9982	.9917	.9966	.9951	.1772	.9992	.9987	.9986	1.0001	1.0318
.150	.701E+08	.9527	1.7758	.9960	.9813	.9924	.9889	.2636	.9983	.9968	.9969	1.0001	1.0308
.200	.929E+08	.9526	1.7758	.9930	.9670	.9866	.9803	.3474	.9970	.9943	.9945	1.0000	1.0294
.250	.115E+09	.9525	1.7757	.9891	.9491	.9792	.9695	.4277	.9953	.9912	.9915	1.0001	1.0277
.300	.137E+09	.9524	1.7756	.9845	.9279	.9704	.9567	.5041	.9933	.9877	.9878	1.0003	1.0259
.350	.158E+09	.9522	1.7754	.9791	.9037	.9601	.9418	.5758	.9910	.9836	.9836	1.0005	1.0237
.400	.178E+09	.9521	1.7752	.9729	.8768	.9485	.9251	.6423	.9884	.9790	.9789	1.0009	1.0214
.450	.197E+09	.9519	1.7750	.9661	.8478	.9358	.9069	.7034	.9855	.9742	.9736	1.0015	1.0190
.500	.215E+09	.9517	1.7748	.9586	.8169	.9219	.8871	.7587	.9823	.9691	.9680	1.0022	1.0165
.550	.233E+09	.9516	1.7745	.9506	.7845	.9070	.8661	.8079	.9789	.9636	.9619	1.0031	1.0138
.600	.249E+09	.9514	1.7742	.9421	.7513	.8913	.8442	.8513	.9754	.9583	.9555	1.0044	1.0116
.650	.264E+09	.9512	1.7738	.9330	.7173	.8749	.8213	.8886	.9717	.9529	.9488	1.0059	1.0092
.700	.279E+09	.9510	1.7734	.9236	.6830	.8578	.7977	.9201	.9678	.9474	.9419	1.0077	1.0069
.750	.292E+09	.9508	1.7730	.9137	.6487	.8402	.7736	.9459	.9638	.9420	.9347	1.0099	1.0049
.800	.304E+09	.9507	1.7727	.9036	.6147	.8222	.7492	.9663	.9597	.9369	.9274	1.0125	1.0033
.850	.315E+09	.9505	1.7723	.8932	.5811	.8039	.7247	.9816	.9556	.9320	.9200	1.0155	1.0019
.900	.326E+09	.9503	1.7720	.8826	.5483	.7853	.7000	.9920	.9514	.9273	.9125	1.0188	1.0008
.950	.335E+09	.9502	1.7716	.8718	.5164	.7666	.6754	.9980	.9472	.9230	.9049	1.0227	1.0002
1.000	.343E+09	.9500	1.7713	.8608	.4855	.7478	.6511	1.0000	.9429	.9191	.8974	1.0271	1.0000
1.050	.351E+09	.9499	1.7709	.8497	.4558	.7290	.6271	.9982	.9387	.9156	.8898	1.0321	1.0003
1.100	.358E+09	.9498	1.7704	.8385	.4274	.7104	.6035	.9931	.9345	.9125	.8823	1.0374	1.0010
1.150	.364E+09	.9497	1.7700	.8273	.4002	.6918	.5803	.9850	.9303	.9099	.8748	1.0434	1.0022
1.200	.369E+09	.9496	1.7695	.8160	.3743	.6735	.5576	.9742	.9261	.9077	.8674	1.0499	1.0039
1.250	.374E+09	.9496	1.7690	.8048	.3498	.6554	.5356	.9613	.9220	.9061	.8602	1.0570	1.0062
1.300	.378E+09	.9495	1.7685	.7936	.3266	.6375	.5141	.9462	.9179	.9050	.8530	1.0646	1.0090
1.350	.381E+09	.9495	1.7679	.7824	.3047	.6200	.4932	.9295	.9139	.9044	.8460	1.0727	1.0122
1.400	.384E+09	.9494	1.7673	.7713	.2842	.6028	.4730	.9113	.9100	.9043	.8391	1.0814	1.0161
1.450	.387E+09	.9494	1.7668	.7603	.2649	.5860	.4536	.8922	.9062	.9049	.8324	1.0909	1.0206
1.500	.389E+09	.9494	1.7662	.7494	.2468	.5696	.4348	.8720	.9024	.9059	.8259	1.1008	1.0256
1.550	.390E+09	.9494	1.7656	.7386	.2298	.5535	.4166	.8511	.8987	.9074	.8195	1.1112	1.0311
1.600	.392E+09	.9494	1.7650	.7280	.2140	.5379	.3992	.8297	.8951	.9095	.8133	1.1223	1.0373
1.650	.393E+09	.9494	1.7644	.7175	.1992	.5226	.3825	.8079	.8916	.9122	.8072	1.1340	1.0440
1.700	.393E+09	.9495	1.7638	.7071	.1855	.5078	.3665	.7860	.8882	.9154	.8014	1.1464	1.0513
1.750	.393E+09	.9495	1.7633	.6969	.1726	.4934	.3510	.7638	.8849	.9190	.7956	1.1590	1.0590
1.800	.393E+09	.9495	1.7628	.6868	.1607	.4794	.3363	.7418	.8817	.9233	.7901	1.1725	1.0674
1.850	.393E+09	.9496	1.7623	.6769	.1496	.4659	.3223	.7198	.8786	.9279	.7848	1.1865	1.0763
1.900	.393E+09	.9496	1.7620	.6672	.1393	.4527	.3087	.6981	.8755	.9332	.7796	1.2010	1.0857
1.950	.392E+09	.9496	1.7616	.6576	.1297	.4400	.2958	.6767	.8726	.9389	.7746	1.2162	1.0957

SATURATION BOUNDARY REACHED.

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.21135E-04	.76359E-04	.7381
.050	1.6841	.21119E-04	.76296E-04	.7382
.100	1.7097	.21072E-04	.76109E-04	.7383
.150	1.6833	.20995E-04	.75797E-04	.7386
.200	1.6834	.20887E-04	.75365E-04	.7389
.250	1.6877	.20750E-04	.74817E-04	.7393
.300	1.6925	.20585E-04	.74159E-04	.7399
.350	1.6871	.20393E-04	.73397E-04	.7405
.400	1.6873	.20176E-04	.72560E-04	.7409
.450	1.6908	.19936E-04	.71638E-04	.7414
.500	1.6857	.19674E-04	.70633E-04	.7419
.550	1.6831	.19392E-04	.69555E-04	.7424
.600	1.6901	.19092E-04	.68414E-04	.7438
.650	1.6839	.18776E-04	.67215E-04	.7436
.700	1.6830	.18446E-04	.65966E-04	.7443
.750	1.6823	.18103E-04	.64678E-04	.7449
.800	1.6833	.17751E-04	.63356E-04	.7455
.850	1.6821	.17389E-04	.62008E-04	.7460
.900	1.6785	.17020E-04	.60623E-04	.7466
.950	1.6806	.16645E-04	.59208E-04	.7474
1.000	1.6806	.16267E-04	.57769E-04	.7484
1.050	1.6797	.15886E-04	.56314E-04	.7496
1.100	1.6778	.15504E-04	.54896E-04	.7502
1.150	1.6762	.15122E-04	.53487E-04	.7508
1.200	1.6761	.14741E-04	.52089E-04	.7514
1.250	1.6775	.14363E-04	.50706E-04	.7519
1.300	1.6752	.13987E-04	.49341E-04	.7523
1.350	1.6735	.13615E-04	.47987E-04	.7529
1.400	1.6733	.13247E-04	.46649E-04	.7535
1.450	1.6749	.12885E-04	.45330E-04	.7542
1.500	1.6727	.12528E-04	.44031E-04	.7550
1.550	1.6704	.12178E-04	.42756E-04	.7559
1.600	1.6713	.11834E-04	.41507E-04	.7568
1.650	1.6709	.11497E-04	.40286E-04	.7578
1.700	1.6715	.11167E-04	.39094E-04	.7589
1.750	1.6667	.10845E-04	.38077E-04	.7570
1.800	1.6701	.10530E-04	.37265E-04	.7516
1.850	1.6677	.10222E-04	.36488E-04	.7458
1.900	1.6680	.99226E-05	.35745E-04	.7397
1.950	1.6682	.96307E-05	.35033E-04	.7333

SATURATION BOUNDARY REACHED.

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. TT = 60.0 K PT = 3.0 ATM RHOT = .125E-02 G/CM3 SVT = 634.987 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9864	1.6746	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.136E+08	.9864	1.6748	.9996	.9979	.9992	.9987	.0883	.9999	.9996	.9997	.9999	1.0239
.100	.271E+08	.9863	1.6752	.9985	.9917	.9968	.9949	.1758	.9995	.9987	.9988	.9999	1.0235
.150	.404E+08	.9863	1.6760	.9967	.9816	.9928	.9888	.2616	.9989	.9972	.9973	1.0000	1.0230
.200	.536E+08	.9862	1.6770	.9941	.9676	.9872	.9803	.3449	.9981	.9950	.9951	1.0000	1.0221
.250	.664E+08	.9861	1.6783	.9909	.9500	.9802	.9695	.4250	.9970	.9923	.9924	1.0000	1.0211
.300	.788E+08	.9860	1.6797	.9869	.9292	.9717	.9566	.5012	.9957	.9891	.9892	1.0002	1.0200
.350	.908E+08	.9859	1.6814	.9822	.9053	.9618	.9417	.5729	.9942	.9853	.9854	1.0004	1.0186
.400	.102E+09	.9858	1.6832	.9769	.8786	.9506	.9248	.6395	.9924	.9810	.9810	1.0006	1.0169
.450	.113E+09	.9857	1.6850	.9709	.8498	.9382	.9064	.7008	.9903	.9765	.9762	1.0010	1.0152
.500	.124E+09	.9855	1.6869	.9642	.8190	.9246	.8866	.7564	.9880	.9716	.9709	1.0016	1.0134
.550	.134E+09	.9854	1.6888	.9570	.7867	.9101	.8653	.8069	.9855	.9662	.9651	1.0021	1.0114
.600	.143E+09	.9852	1.6907	.9492	.7533	.8946	.8430	.8496	.9828	.9608	.9590	1.0031	1.0095
.650	.151E+09	.9850	1.6925	.9409	.7193	.8783	.8200	.8874	.9798	.9554	.9526	1.0044	1.0078
.700	.159E+09	.9849	1.6941	.9320	.6848	.8614	.7962	.9192	.9766	.9499	.9458	1.0058	1.0060
.750	.167E+09	.9847	1.6957	.9227	.6503	.8439	.7719	.9454	.9733	.9444	.9388	1.0077	1.0044
.800	.173E+09	.9845	1.6970	.9130	.6161	.8259	.7474	.9661	.9697	.9392	.9316	1.0100	1.0030
.850	.179E+09	.9844	1.6982	.9030	.5823	.8075	.7225	.9814	.9661	.9339	.9242	1.0125	1.0017
.900	.185E+09	.9842	1.6992	.8927	.5492	.7889	.6977	.9919	.9623	.9289	.9167	1.0155	1.0007
.950	.190E+09	.9840	1.7001	.8821	.5172	.7702	.6731	.9981	.9584	.9244	.9092	1.0191	1.0003
1.000	.194E+09	.9839	1.7008	.8712	.4861	.7514	.6486	1.0000	.9544	.9201	.9016	1.0231	1.0000
1.050	.198E+09	.9837	1.7013	.8603	.4562	.7325	.6245	.9982	.9504	.9164	.8941	1.0277	1.0003
1.100	.201E+09	.9836	1.7017	.8492	.4276	.7138	.6008	.9930	.9463	.9130	.8865	1.0328	1.0009
1.150	.204E+09	.9835	1.7020	.8380	.4003	.6952	.5776	.9850	.9423	.9102	.8790	1.0385	1.0022
1.200	.206E+09	.9833	1.7021	.8267	.3743	.6767	.5548	.9740	.9382	.9077	.8716	1.0446	1.0036
1.250	.209E+09	.9832	1.7022	.8154	.3497	.6585	.5328	.9610	.9342	.9059	.8643	1.0515	1.0059
1.300	.210E+09	.9831	1.7022	.8042	.3265	.6406	.5113	.9459	.9302	.9045	.8572	1.0588	1.0086
1.350	.212E+09	.9830	1.7022	.7929	.3045	.6230	.4905	.9291	.9263	.9037	.8501	1.0667	1.0119
1.400	.213E+09	.9829	1.7021	.7818	.2839	.6057	.4703	.9110	.9224	.9035	.8432	1.0753	1.0157
1.450	.213E+09	.9828	1.7019	.7707	.2645	.5888	.4509	.8917	.9185	.9038	.8364	1.0843	1.0200
1.500	.214E+09	.9828	1.7018	.7597	.2464	.5723	.4321	.8714	.9148	.9046	.8298	1.0940	1.0249
1.550	.214E+09	.9827	1.7016	.7488	.2294	.5562	.4141	.8505	.9111	.9059	.8234	1.1044	1.0305
1.600	.214E+09	.9826	1.7014	.7381	.2136	.5404	.3967	.8290	.9075	.9078	.8171	1.1152	1.0364
1.650	.214E+09	.9826	1.7013	.7274	.1988	.5251	.3801	.8073	.9040	.9103	.8110	1.1268	1.0432
1.700	.214E+09	.9825	1.7011	.7169	.1850	.5102	.3640	.7851	.9006	.9130	.8050	1.1386	1.0501
1.750	.213E+09	.9825	1.7009	.7066	.1722	.4957	.3487	.7631	.8973	.9166	.7993	1.1513	1.0580
1.800	.213E+09	.9825	1.7007	.6964	.1602	.4816	.3340	.7409	.8941	.9205	.7936	1.1644	1.0661
1.850	.212E+09	.9824	1.7005	.6864	.1491	.4679	.3199	.7189	.8909	.9249	.7882	1.1781	1.0749
1.900	.211E+09	.9824	1.7003	.6766	.1388	.4546	.3065	.6973	.8878	.9300	.7829	1.1927	1.0845
1.950	.210E+09	.9824	1.7001	.6669	.1292	.4418	.2936	.6757	.8849	.9354	.7778	1.2075	1.0942
2.000	.209E+09	.9824	1.6999	.6574	.1203	.4293	.2814	.6547	.8820	.9415	.7728	1.2232	1.1048

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.29071E-04	.11020E-03	.6885
.050	1.6234	.29052E-04	.11011E-03	.6885
.100	1.6467	.28997E-04	.10984E-03	.6886
.150	1.6585	.28905E-04	.10940E-03	.6887
.200	1.6520	.28776E-04	.10879E-03	.6888
.250	1.6546	.28613E-04	.10801E-03	.6890
.300	1.6601	.28415E-04	.10706E-03	.6892
.350	1.6575	.28184E-04	.10597E-03	.6896
.400	1.6547	.27922E-04	.10472E-03	.6901
.450	1.6629	.27629E-04	.10334E-03	.6907
.500	1.6626	.27309E-04	.10099E-03	.6972
.550	1.6592	.26962E-04	.99487E-04	.6975
.600	1.6650	.26591E-04	.97885E-04	.6979
.650	1.6693	.26199E-04	.96200E-04	.6983
.700	1.6667	.25787E-04	.94455E-04	.6989
.750	1.6697	.25358E-04	.92647E-04	.6995
.800	1.6727	.24914E-04	.90796E-04	.7003
.850	1.6678	.24457E-04	.88912E-04	.7011
.900	1.6714	.23990E-04	.86998E-04	.7020
.950	1.6745	.23515E-04	.85020E-04	.7033
1.000	1.6718	.23034E-04	.83029E-04	.7046
1.050	1.6742	.22548E-04	.80774E-04	.7066
1.100	1.6727	.22059E-04	.78828E-04	.7099
1.150	1.6758	.21569E-04	.76897E-04	.7112
1.200	1.6705	.21080E-04	.74984E-04	.7124
1.250	1.6754	.20591E-04	.73097E-04	.7136
1.300	1.6727	.20106E-04	.71239E-04	.7147
1.350	1.6731	.19624E-04	.69413E-04	.7157
1.400	1.6731	.19146E-04	.67620E-04	.7166
1.450	1.6721	.18674E-04	.65864E-04	.7174
1.500	1.6720	.18208E-04	.64147E-04	.7181
1.550	1.6724	.17748E-04	.62469E-04	.7186
1.600	1.6709	.17295E-04	.60833E-04	.7190
1.650	1.6735	.16851E-04	.59171E-04	.7200
1.700	1.6677	.16413E-04	.57531E-04	.7212
1.750	1.6729	.15985E-04	.55934E-04	.7223
1.800	1.6686	.15564E-04	.54382E-04	.7232
1.850	1.6700	.15153E-04	.52872E-04	.7241
1.900	1.6729	.14750E-04	.51406E-04	.7248
1.950	1.6676	.14356E-04	.49983E-04	.7254
2.000	1.6727	.13972E-04	.48580E-04	.7263

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. TT = 80.0 K PT = 3.0 ATM RHOT = .925E-03 G/CM3 SVT = 714.525 M/SEC

MACH	RE/M	Z	GP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9957	1.5608	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.917E+07	.9957	1.5611	.9997	.9980	.9993	.9987	.0868	1.0000	.9998	.9998	1.0000	1.0059
.100	.183E+08	.9956	1.5619	.9990	.9923	.9973	.9951	.1728	1.0000	.9993	.9993	1.0001	1.0059
.150	.273E+08	.9956	1.5634	.9977	.9826	.9938	.9887	.2572	.9999	.9981	.9983	.9999	1.0057
.200	.361E+08	.9956	1.5655	.9959	.9696	.9891	.9804	.3394	.9999	.9970	.9970	1.0001	1.0059
.250	.448E+08	.9955	1.5681	.9936	.9528	.9830	.9694	.4186	.9998	.9951	.9953	1.0000	1.0057
.300	.531E+08	.9954	1.5713	.9908	.9328	.9756	.9563	.4941	.9997	.9929	.9932	1.0000	1.0055
.350	.612E+08	.9954	1.5750	.9875	.9100	.9669	.9414	.5655	.9995	.9905	.9906	1.0001	1.0055
.400	.690E+08	.9953	1.5792	.9836	.8843	.9570	.9243	.6322	.9993	.9874	.9877	1.0001	1.0052
.450	.764E+08	.9952	1.5839	.9793	.8563	.9460	.9057	.6937	.9989	.9840	.9843	1.0002	1.0050
.500	.834E+08	.9951	1.5890	.9744	.8262	.9338	.8853	.7498	.9985	.9801	.9805	1.0002	1.0045
.550	.899E+08	.9950	1.5945	.9690	.7945	.9205	.8637	.8001	.9979	.9758	.9762	1.0003	1.0041
.600	.961E+08	.9948	1.6003	.9631	.7614	.9062	.8409	.8447	.9972	.9712	.9715	1.0006	1.0036
.650	.102E+09	.9947	1.6064	.9567	.7274	.8910	.8172	.8833	.9963	.9663	.9663	1.0009	1.0031
.700	.107E+09	.9946	1.6127	.9498	.6929	.8750	.7928	.9162	.9952	.9612	.9607	1.0015	1.0026
.750	.112E+09	.9945	1.6190	.9423	.6581	.8582	.7678	.9432	.9939	.9558	.9548	1.0023	1.0020
.800	.116E+09	.9943	1.6253	.9344	.6233	.8408	.7423	.9645	.9924	.9501	.9484	1.0031	1.0014
.850	.120E+09	.9942	1.6316	.9260	.5888	.8228	.7166	.9805	.9907	.9443	.9417	1.0042	1.0007
.900	.124E+09	.9941	1.6376	.9172	.5550	.8044	.6911	.9915	.9887	.9387	.9347	1.0059	1.0003
.950	.127E+09	.9939	1.6434	.9079	.5221	.7857	.6656	.9979	.9865	.9332	.9275	1.0078	1.0000
1.000	.129E+09	.9938	1.6488	.8983	.4902	.7668	.6405	1.0000	.9840	.9279	.9201	1.0103	1.0000
1.050	.132E+09	.9937	1.6538	.8883	.4594	.7477	.6157	.9981	.9813	.9228	.9126	1.0132	1.0001
1.100	.134E+09	.9935	1.6584	.8780	.4300	.7286	.5914	.9927	.9784	.9180	.9050	1.0166	1.0006
1.150	.135E+09	.9934	1.6625	.8674	.4019	.7096	.5676	.9842	.9754	.9138	.8973	1.0207	1.0014
1.200	.137E+09	.9933	1.6662	.8566	.3753	.6907	.5446	.9731	.9722	.9101	.8897	1.0254	1.0027
1.250	.138E+09	.9932	1.6693	.8456	.3501	.6721	.5222	.9594	.9688	.9068	.8821	1.0306	1.0043
1.300	.139E+09	.9931	1.6720	.8346	.3264	.6536	.5006	.9441	.9654	.9043	.8746	1.0367	1.0067
1.350	.139E+09	.9930	1.6743	.8234	.3041	.6355	.4798	.9270	.9618	.9024	.8672	1.0434	1.0095
1.400	.140E+09	.9929	1.6762	.8122	.2832	.6178	.4597	.9085	.9583	.9011	.8600	1.0508	1.0129
1.450	.140E+09	.9928	1.6778	.8010	.2636	.6004	.4403	.8886	.9547	.9004	.8529	1.0588	1.0167
1.500	.140E+09	.9927	1.6790	.7898	.2453	.5835	.4216	.8682	.9511	.9004	.8460	1.0674	1.0212
1.550	.140E+09	.9926	1.6800	.7787	.2282	.5669	.4036	.8472	.9475	.9011	.8393	1.0770	1.0264
1.600	.140E+09	.9925	1.6807	.7677	.2123	.5508	.3867	.8255	.9439	.9024	.8328	1.0870	1.0321
1.650	.139E+09	.9925	1.6813	.7567	.1975	.5351	.3703	.8036	.9404	.9043	.8265	1.0978	1.0385
1.700	.139E+09	.9924	1.6817	.7459	.1837	.5198	.3546	.7815	.9370	.9068	.8203	1.1091	1.0453
1.750	.138E+09	.9923	1.6820	.7352	.1709	.5050	.3395	.7593	.9336	.9099	.8144	1.1210	1.0528
1.800	.138E+09	.9923	1.6822	.7247	.1590	.4907	.3252	.7373	.9303	.9137	.8086	1.1336	1.0610
1.850	.137E+09	.9922	1.6823	.7143	.1480	.4767	.3114	.7153	.9271	.9179	.8030	1.1470	1.0696
1.900	.136E+09	.9922	1.6824	.7041	.1377	.4632	.2983	.6937	.9239	.9227	.7976	1.1609	1.0789
1.950	.135E+09	.9922	1.6824	.6940	.1282	.4501	.2858	.6727	.9209	.9278	.7924	1.1751	1.0885
2.000	.134E+09	.9921	1.6824	.6841	.1193	.4374	.2738	.6511	.9179	.9336	.7873	1.1900	1.0987

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.36024E-04	.14648E-03	.6980
.050	1.5471	.36006E-04	.14635E-03	.6980
.100	1.5699	.35950E-04	.14597E-03	.6980
.150	1.5390	.35857E-04	.14533E-03	.6981
.200	1.5708	.35728E-04	.14445E-03	.6981
.250	1.5563	.35563E-04	.14331E-03	.6982
.300	1.5594	.35361E-04	.14194E-03	.6984
.350	1.5715	.35124E-04	.14052E-03	.6978
.400	1.5671	.34853E-04	.13903E-03	.6964
.450	1.5745	.34547E-04	.13737E-03	.6950
.500	1.5769	.34209E-04	.13553E-03	.6935
.550	1.5833	.33840E-04	.13354E-03	.6921
.600	1.5896	.33440E-04	.13139E-03	.6907
.650	1.5944	.33011E-04	.12910E-03	.6894
.700	1.6037	.32556E-04	.12668E-03	.6883
.750	1.6079	.32076E-04	.12415E-03	.6874
.800	1.6122	.31574E-04	.12152E-03	.6868
.850	1.6173	.31052E-04	.11888E-03	.6860
.900	1.6263	.30513E-04	.11622E-03	.6853
.950	1.6311	.29959E-04	.11352E-03	.6858
1.000	1.6372	.29393E-04	.11077E-03	.6850
1.050	1.6408	.28817E-04	.10800E-03	.6854
1.100	1.6459	.28235E-04	.10523E-03	.6862
1.150	1.6493	.27649E-04	.10246E-03	.6874
1.200	1.6549	.27061E-04	.99325E-04	.6916
1.250	1.6543	.26474E-04	.96793E-04	.6921
1.300	1.6616	.25888E-04	.94298E-04	.6929
1.350	1.6619	.25305E-04	.91850E-04	.6938
1.400	1.6635	.24728E-04	.89459E-04	.6949
1.450	1.6633	.24156E-04	.87102E-04	.6960
1.500	1.6650	.23592E-04	.84798E-04	.6974
1.550	1.6685	.23035E-04	.82513E-04	.6990
1.600	1.6678	.22486E-04	.80172E-04	.7016
1.650	1.6685	.21946E-04	.78040E-04	.7030
1.700	1.6678	.21416E-04	.75966E-04	.7044
1.750	1.6685	.20895E-04	.73953E-04	.7056
1.800	1.6714	.20384E-04	.71998E-04	.7068
1.850	1.6683	.19882E-04	.70101E-04	.7079
1.900	1.6703	.19392E-04	.68256E-04	.7089
1.950	1.6671	.18911E-04	.66468E-04	.7098
2.000	1.6679	.18440E-04	.64734E-04	.7106

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. TT = 100.0 K PT = 3.0 ATM RHOT = .738E-03 G/CM3 SVT = 773.711 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9992	1.4538	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.674E+07	.9992	1.4540	.9998	.9982	.9994	.9988	.0857	1.0000	1.0000	.9999	1.0000	.9940
.100	.134E+08	.9992	1.4547	.9992	.9927	.9978	.9949	.1707	1.0002	.9996	.9998	.9999	.9940
.150	.200E+08	.9992	1.4559	.9982	.9879	.9950	.9889	.2543	1.0004	.9995	.9994	1.0001	.9944
.200	.265E+08	.9991	1.4575	.9967	.9715	.9911	.9804	.3357	1.0007	.9990	.9990	1.0001	.9947
.250	.329E+08	.9991	1.4596	.9949	.9557	.9861	.9694	.4141	1.0011	.9982	.9984	.9999	.9950
.300	.390E+08	.9990	1.4622	.9926	.9370	.9800	.9563	.4891	1.0015	.9974	.9976	1.0000	.9954
.350	.449E+08	.9990	1.4653	.9900	.9154	.9728	.9412	.5601	1.0021	.9963	.9967	.9999	.9959
.400	.505E+08	.9989	1.4690	.9870	.8911	.9646	.9241	.6266	1.0026	.9950	.9955	.9998	.9964
.450	.559E+08	.9988	1.4731	.9836	.8646	.9554	.9053	.6882	1.0033	.9935	.9941	.9998	.9970
.500	.609E+08	.9987	1.4778	.9798	.8358	.9452	.8847	.7444	1.0040	.9914	.9924	.9994	.9973
.550	.657E+08	.9987	1.4830	.9756	.8055	.9340	.8629	.7953	1.0047	.9894	.9905	.9994	.9980
.600	.700E+08	.9986	1.4888	.9710	.7736	.9219	.8397	.8403	1.0054	.9868	.9882	.9992	.9984
.650	.741E+08	.9985	1.4952	.9661	.7406	.9088	.8155	.8796	1.0061	.9838	.9856	.9988	.9988
.700	.778E+08	.9984	1.5021	.9608	.7068	.8949	.7904	.9130	1.0068	.9804	.9826	.9985	.9992
.750	.811E+08	.9983	1.5096	.9552	.6724	.8802	.7646	.9408	1.0074	.9765	.9793	.9982	.9995
.800	.841E+08	.9982	1.5176	.9491	.6379	.8647	.7385	.9630	1.0080	.9724	.9754	.9979	.9999
.850	.868E+08	.9981	1.5261	.9427	.6033	.8485	.7118	.9797	1.0085	.9677	.9712	.9975	.9999
.900	.891E+08	.9980	1.5351	.9359	.5691	.8317	.6851	.9912	1.0089	.9625	.9664	.9972	1.0000
.950	.912E+08	.9979	1.5444	.9288	.5355	.8143	.6585	.9980	1.0091	.9572	.9612	.9971	1.0001
1.000	.929E+08	.9978	1.5540	.9213	.5025	.7963	.6320	1.0000	1.0092	.9513	.9556	.9969	1.0000
1.050	.943E+08	.9977	1.5639	.9134	.4706	.7780	.6059	.9980	1.0091	.9453	.9495	.9971	1.0001
1.100	.955E+08	.9976	1.5738	.9051	.4399	.7593	.5803	.9923	1.0087	.9392	.9430	.9976	1.0002
1.150	.965E+08	.9975	1.5837	.8965	.4104	.7403	.5552	.9831	1.0081	.9330	.9362	.9983	1.0003
1.200	.972E+08	.9974	1.5934	.8875	.3823	.7213	.5310	.9712	1.0072	.9270	.9290	.9997	1.0008
1.250	.977E+08	.9973	1.6028	.8781	.3556	.7022	.5074	.9566	1.0060	.9211	.9216	1.0014	1.0013
1.300	.980E+08	.9972	1.6117	.8685	.3305	.6831	.4847	.9399	1.0046	.9156	.9140	1.0038	1.0022
1.350	.982E+08	.9971	1.6201	.8585	.3068	.6642	.4629	.9215	1.0029	.9105	.9064	1.0067	1.0035
1.400	.982E+08	.9970	1.6279	.8483	.2847	.6456	.4420	.9017	1.0009	.9061	.8986	1.0105	1.0053
1.450	.981E+08	.9969	1.6350	.8379	.2641	.6272	.4221	.8808	.9987	.9024	.8910	1.0151	1.0076
1.500	.979E+08	.9968	1.6414	.8274	.2449	.6092	.4030	.8591	.9963	.8992	.8834	1.0203	1.0104
1.550	.976E+08	.9968	1.6470	.8167	.2272	.5916	.3849	.8368	.9937	.8969	.8759	1.0265	1.0139
1.600	.972E+08	.9967	1.6519	.8059	.2107	.5745	.3677	.8143	.9909	.8955	.8686	1.0336	1.0180
1.650	.967E+08	.9966	1.6562	.7951	.1955	.5578	.3513	.7916	.9881	.8950	.8615	1.0416	1.0230
1.700	.962E+08	.9966	1.6598	.7842	.1814	.5416	.3358	.7690	.9851	.8954	.8546	1.0504	1.0286
1.750	.956E+08	.9965	1.6628	.7734	.1684	.5259	.3210	.7463	.9821	.8964	.8480	1.0600	1.0348
1.800	.949E+08	.9964	1.6653	.7627	.1563	.5107	.3070	.7238	.9791	.8983	.8416	1.0703	1.0416
1.850	.942E+08	.9964	1.6674	.7520	.1452	.4959	.2937	.7017	.9761	.9010	.8354	1.0815	1.0492
1.900	.935E+08	.9963	1.6690	.7415	.1350	.4817	.2810	.6800	.9730	.9044	.8295	1.0935	1.0576
1.950	.927E+08	.9963	1.6704	.7311	.1255	.4679	.2689	.6585	.9700	.9084	.8238	1.1060	1.0663
2.000	.920E+08	.9963	1.6714	.7208	.1167	.4546	.2575	.6375	.9671	.9132	.8183	1.1193	1.0758

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.42301E-04	.19268E-03	.7079
.050	1.4600	.42284E-04	.19254E-03	.7079
.100	1.4398	.42232E-04	.19213E-03	.7077
.150	1.4669	.42146E-04	.19146E-03	.7075
.200	1.4566	.42026E-04	.19052E-03	.7071
.250	1.4522	.41871E-04	.18931E-03	.7067
.300	1.4611	.41683E-04	.18785E-03	.7062
.350	1.4616	.41462E-04	.18612E-03	.7056
.400	1.4657	.41207E-04	.18415E-03	.7049
.450	1.4711	.40919E-04	.18193E-03	.7042
.500	1.4703	.40599E-04	.17947E-03	.7034
.550	1.4820	.40247E-04	.17677E-03	.7026
.600	1.4832	.39864E-04	.17385E-03	.7018
.650	1.4891	.39450E-04	.17071E-03	.7010
.700	1.4958	.39005E-04	.16737E-03	.7003
.750	1.5034	.38532E-04	.16392E-03	.6993
.800	1.5127	.38031E-04	.16035E-03	.6981
.850	1.5180	.37503E-04	.15662E-03	.6972
.900	1.5266	.36949E-04	.15274E-03	.6964
.950	1.5379	.36372E-04	.14873E-03	.6960
1.000	1.5442	.35773E-04	.14460E-03	.6960
1.050	1.5560	.35154E-04	.14037E-03	.6965
1.100	1.5659	.34517E-04	.13607E-03	.6934
1.150	1.5741	.33866E-04	.13334E-03	.6907
1.200	1.5861	.33204E-04	.12976E-03	.6884
1.250	1.5929	.32533E-04	.12621E-03	.6867
1.300	1.6032	.31857E-04	.12264E-03	.6855
1.350	1.6108	.31178E-04	.11912E-03	.6848
1.400	1.6195	.30500E-04	.11577E-03	.6839
1.450	1.6275	.29826E-04	.11246E-03	.6836
1.500	1.6313	.29156E-04	.10921E-03	.6838
1.550	1.6387	.28494E-04	.10603E-03	.6846
1.600	1.6436	.27840E-04	.10293E-03	.6858
1.650	1.6501	.27197E-04	.99915E-04	.6874
1.700	1.6535	.26565E-04	.96930E-04	.6897
1.750	1.6553	.25945E-04	.94289E-04	.6905
1.800	1.6570	.25337E-04	.91732E-04	.6915
1.850	1.6605	.24742E-04	.89257E-04	.6926
1.900	1.6634	.24159E-04	.86865E-04	.6938
1.950	1.6615	.23589E-04	.84541E-04	.6951
2.000	1.6643	.23032E-04	.82274E-04	.6967

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. TT = 200.0 K PT = 3.0 ATM RHOT = .368E-03 G/CM3 SVT =1056.041 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0020	1.3467	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.284E+07	1.0020	1.3466	.9998	.9982	.9996	.9986	.0859	1.0000	1.0000	1.0001	.9999	.9957
.100	.566E+07	1.0020	1.3465	.9991	.9933	.9983	.9951	.1710	1.0001	1.0003	1.0003	1.0000	.9958
.150	.845E+07	1.0020	1.3463	.9979	.9849	.9961	.9887	.2547	1.0001	1.0005	1.0006	.9999	.9958
.200	.112E+08	1.0020	1.3461	.9963	.9735	.9931	.9803	.3361	1.0003	1.0010	1.0011	1.0000	.9960
.250	.138E+08	1.0019	1.3458	.9942	.9588	.9893	.9693	.4145	1.0004	1.0014	1.0017	.9999	.9960
.300	.164E+08	1.0019	1.3454	.9917	.9416	.9847	.9563	.4896	1.0006	1.0022	1.0024	1.0000	.9963
.350	.188E+08	1.0018	1.3449	.9888	.9216	.9793	.9412	.5604	1.0008	1.0030	1.0033	.9999	.9965
.400	.211E+08	1.0018	1.3444	.9854	.8991	.9731	.9241	.6268	1.0011	1.0039	1.0043	.9998	.9967
.450	.233E+08	1.0017	1.3439	.9817	.8745	.9663	.9053	.6881	1.0014	1.0049	1.0054	.9998	.9969
.500	.253E+08	1.0017	1.3433	.9776	.8482	.9587	.8850	.7443	1.0018	1.0061	1.0067	.9997	.9972
.550	.272E+08	1.0016	1.3427	.9732	.8202	.9506	.8632	.7949	1.0022	1.0074	1.0081	.9997	.9976
.600	.289E+08	1.0016	1.3421	.9684	.7907	.9418	.8400	.8398	1.0026	1.0086	1.0096	.9994	.9978
.650	.305E+08	1.0015	1.3415	.9633	.7603	.9324	.8158	.8789	1.0031	1.0099	1.0112	.9992	.9981
.700	.319E+08	1.0014	1.3408	.9579	.7292	.9226	.7909	.9124	1.0037	1.0115	1.0130	.9991	.9986
.750	.331E+08	1.0014	1.3403	.9522	.6975	.9122	.7651	.9401	1.0044	1.0129	1.0149	.9987	.9988
.800	.342E+08	1.0013	1.3397	.9463	.6656	.9014	.7389	.9625	1.0051	1.0146	1.0168	.9985	.9993
.850	.351E+08	1.0012	1.3392	.9402	.6335	.8902	.7122	.9793	1.0058	1.0161	1.0189	.9980	.9995
.900	.358E+08	1.0012	1.3388	.9338	.6016	.8787	.6853	.9910	1.0067	1.0176	1.0210	.9974	.9998
.950	.364E+08	1.0011	1.3384	.9273	.5701	.8668	.6583	.9978	1.0075	1.0190	1.0233	.9967	1.0000
1.000	.368E+08	1.0010	1.3382	.9206	.5390	.8546	.6313	1.0000	1.0085	1.0203	1.0256	.9958	1.0000
1.050	.371E+08	1.0010	1.3380	.9138	.5086	.8422	.6045	.9980	1.0095	1.0215	1.0279	.9948	1.0000
1.100	.373E+08	1.0009	1.3380	.9068	.4788	.8295	.5778	.9918	1.0106	1.0223	1.0302	.9933	.9996
1.150	.373E+08	1.0008	1.3382	.8998	.4500	.8166	.5517	.9822	1.0118	1.0231	1.0326	.9919	.9993
1.200	.373E+08	1.0008	1.3386	.8926	.4221	.8036	.5260	.9695	1.0130	1.0237	1.0350	.9903	.9990
1.250	.371E+08	1.0007	1.3392	.8854	.3953	.7903	.5008	.9537	1.0143	1.0239	1.0373	.9884	.9983
1.300	.368E+08	1.0007	1.3400	.8781	.3695	.7769	.4762	.9354	1.0157	1.0238	1.0396	.9862	.9974
1.350	.364E+08	1.0006	1.3410	.8707	.3449	.7635	.4524	.9151	1.0171	1.0236	1.0418	.9840	.9965
1.400	.360E+08	1.0006	1.3423	.8633	.3214	.7499	.4292	.8927	1.0186	1.0229	1.0439	.9813	.9953
1.450	.355E+08	1.0005	1.3439	.8559	.2990	.7362	.4068	.8687	1.0201	1.0216	1.0458	.9783	.9937
1.500	.349E+08	1.0005	1.3458	.8484	.2778	.7225	.3851	.8433	1.0216	1.0198	1.0476	.9750	.9919
1.550	.342E+08	1.0004	1.3481	.8409	.2577	.7087	.3642	.8169	1.0232	1.0176	1.0492	.9714	.9897
1.600	.336E+08	1.0004	1.3508	.8335	.2388	.6948	.3442	.7898	1.0249	1.0148	1.0505	.9676	.9874
1.650	.328E+08	1.0003	1.3540	.8260	.2209	.6809	.3249	.7619	1.0265	1.0113	1.0516	.9632	.9846
1.700	.321E+08	1.0003	1.3575	.8185	.2041	.6669	.3066	.7340	1.0282	1.0074	1.0524	.9589	.9818
1.750	.313E+08	1.0002	1.3616	.8111	.1884	.6529	.2890	.7059	1.0299	1.0030	1.0529	.9543	.9787
1.800	.305E+08	1.0002	1.3661	.8036	.1737	.6389	.2723	.6777	1.0317	.9978	1.0529	.9494	.9753
1.850	.297E+08	1.0002	1.3712	.7962	.1599	.6249	.2563	.6497	1.0334	.9919	1.0526	.9441	.9714
1.900	.289E+08	1.0001	1.3769	.7888	.1471	.6108	.2412	.6220	1.0351	.9854	1.0518	.9386	.9674
1.950	.281E+08	1.0001	1.3832	.7814	.1351	.5968	.2268	.5948	1.0368	.9782	1.0506	.9329	.9631
2.000	.273E+08	1.0001	1.3901	.7741	.1240	.5827	.2133	.5681	1.0385	.9705	1.0488	.9271	.9587

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.68233E-04	.37355E-03	.7025
.050	1.3223	.68213E-04	.37347E-03	.7025
.100	1.3638	.68153E-04	.37322E-03	.7025
.150	1.3410	.68052E-04	.37281E-03	.7025
.200	1.3530	.67913E-04	.37224E-03	.7025
.250	1.3445	.67734E-04	.37151E-03	.7025
.300	1.3514	.67518E-04	.37063E-03	.7025
.350	1.3472	.67265E-04	.36961E-03	.7025
.400	1.3461	.66976E-04	.36844E-03	.7024
.450	1.3460	.66653E-04	.36713E-03	.7023
.500	1.3470	.66298E-04	.36570E-03	.7021
.550	1.3458	.65911E-04	.36414E-03	.7019
.600	1.3432	.65494E-04	.36218E-03	.7021
.650	1.3436	.65049E-04	.35939E-03	.7037
.700	1.3447	.64577E-04	.35644E-03	.7053
.750	1.3421	.64081E-04	.35335E-03	.7068
.800	1.3431	.63561E-04	.35013E-03	.7084
.850	1.3415	.63020E-04	.34678E-03	.7098
.900	1.3410	.62458E-04	.34333E-03	.7112
.950	1.3403	.61877E-04	.33978E-03	.7125
1.000	1.3393	.61280E-04	.33614E-03	.7136
1.050	1.3399	.60665E-04	.33242E-03	.7145
1.100	1.3380	.60036E-04	.32862E-03	.7151
1.150	1.3393	.59393E-04	.32477E-03	.7155
1.200	1.3397	.58738E-04	.32087E-03	.7156
1.250	1.3397	.58069E-04	.31691E-03	.7153
1.300	1.3401	.57390E-04	.31291E-03	.7147
1.350	1.3424	.56701E-04	.30889E-03	.7136
1.400	1.3420	.56002E-04	.30483E-03	.7121
1.450	1.3436	.55294E-04	.30074E-03	.7101
1.500	1.3449	.54577E-04	.29664E-03	.7076
1.550	1.3472	.53851E-04	.29012E-03	.7103
1.600	1.3501	.53116E-04	.28353E-03	.7128
1.650	1.3516	.52374E-04	.27693E-03	.7148
1.700	1.3568	.51623E-04	.27030E-03	.7164
1.750	1.3608	.50865E-04	.26366E-03	.7177
1.800	1.3642	.50099E-04	.25700E-03	.7185
1.850	1.3686	.49325E-04	.25034E-03	.7189
1.900	1.3741	.48543E-04	.24367E-03	.7189
1.950	1.3804	.47753E-04	.23699E-03	.7184
2.000	1.3875	.46956E-04	.23031E-03	.7175

TABLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. TT = 300.0 K PT = 3.0 ATM RHOT = .245E-03 G/CM3 SVT =1311.496 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0018	1.3699	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.179E+07	1.0018	1.3852	.9997	.9982	.9995	.9987	.0863	1.0000	1.0000	1.0000	.9999	1.0008
.100	.357E+07	1.0018	1.3851	.9990	.9930	.9981	.9949	.1719	1.0000	1.0000	1.0001	.9999	1.0007
.150	.532E+07	1.0018	1.3850	.9977	.9845	.9957	.9868	.2559	.9999	1.0001	1.0002	1.0000	1.0008
.200	.704E+07	1.0017	1.3847	.9959	.9727	.9924	.9802	.3377	.9999	1.0002	1.0003	.9999	1.0007
.250	.871E+07	1.0017	1.3844	.9937	.9578	.9881	.9694	.4165	.9999	1.0004	1.0005	1.0000	1.0007
.300	.103E+08	1.0017	1.3840	.9909	.9399	.9830	.9563	.4916	.9998	1.0005	1.0007	.9999	1.0006
.350	.119E+08	1.0017	1.3836	.9877	.9194	.9770	.9412	.5627	.9997	1.0007	1.0009	.9999	1.0005
.400	.133E+08	1.0016	1.3830	.9840	.8967	.9702	.9244	.6293	.9996	1.0012	1.0012	1.0001	1.0006
.450	.147E+08	1.0016	1.3824	.9799	.8716	.9626	.9056	.6907	.9996	1.0015	1.0016	1.0001	1.0006
.500	.160E+08	1.0016	1.3817	.9754	.8446	.9543	.8853	.7467	.9995	1.0019	1.0020	1.0001	1.0004
.550	.172E+08	1.0015	1.3809	.9705	.8160	.9453	.8634	.7970	.9994	1.0022	1.0025	1.0000	1.0002
.600	.183E+08	1.0015	1.3801	.9651	.7862	.9356	.8405	.8418	.9993	1.0028	1.0030	1.0001	1.0002
.650	.192E+08	1.0014	1.3791	.9595	.7553	.9254	.8164	.8806	.9992	1.0032	1.0036	1.0000	1.0001
.700	.201E+08	1.0014	1.3781	.9535	.7237	.9146	.7916	.9137	.9991	1.0038	1.0043	1.0000	.9999
.750	.209E+08	1.0013	1.3770	.9472	.6916	.9034	.7660	.9410	.9990	1.0044	1.0050	.9999	.9998
.800	.216E+08	1.0013	1.3757	.9406	.6596	.8917	.7401	.9631	.9989	1.0054	1.0059	1.0001	.9999
.850	.222E+08	1.0012	1.3744	.9337	.6275	.8797	.7138	.9797	.9989	1.0064	1.0068	1.0002	.9999
.900	.226E+08	1.0012	1.3730	.9266	.5957	.8673	.6873	.9912	.9988	1.0075	1.0078	1.0003	1.0000
.950	.230E+08	1.0011	1.3715	.9192	.5643	.8547	.6607	.9979	.9988	1.0086	1.0089	1.0004	1.0000
1.000	.233E+08	1.0010	1.3699	.9117	.5335	.8418	.6342	1.0000	.9987	1.0098	1.0101	1.0004	1.0000
1.050	.235E+08	1.0010	1.3683	.9040	.5034	.8287	.6080	.9981	.9987	1.0112	1.0114	1.0005	1.0001
1.100	.236E+08	1.0009	1.3666	.8962	.4742	.8155	.5820	.9923	.9988	1.0125	1.0129	1.0005	1.0001
1.150	.237E+08	1.0009	1.3648	.8882	.4459	.8022	.5563	.9828	.9988	1.0138	1.0144	1.0003	1.0000
1.200	.236E+08	1.0008	1.3629	.8802	.4187	.7889	.5312	.9703	.9989	1.0152	1.0161	1.0001	.9999
1.250	.235E+08	1.0008	1.3611	.8720	.3925	.7755	.5067	.9552	.9990	1.0168	1.0178	1.0000	.9998
1.300	.234E+08	1.0007	1.3591	.8638	.3676	.7621	.4829	.9379	.9992	1.0186	1.0197	1.0000	1.0000
1.350	.232E+08	1.0007	1.3572	.8555	.3437	.7487	.4596	.9180	.9994	1.0200	1.0216	.9995	.9997
1.400	.229E+08	1.0007	1.3553	.8473	.3210	.7354	.4370	.8965	.9996	1.0215	1.0237	.9990	.9995
1.450	.226E+08	1.0006	1.3533	.8390	.2995	.7222	.4151	.8734	.9999	1.0230	1.0258	.9984	.9992
1.500	.222E+08	1.0006	1.3515	.8307	.2790	.7090	.3940	.8491	1.0003	1.0243	1.0281	.9976	.9987
1.550	.218E+08	1.0005	1.3496	.8224	.2597	.6960	.3737	.8236	1.0007	1.0256	1.0304	.9966	.9981
1.600	.214E+08	1.0005	1.3478	.8142	.2416	.6830	.3541	.7978	1.0011	1.0267	1.0328	.9955	.9974
1.650	.210E+08	1.0005	1.3461	.8060	.2245	.6703	.3354	.7713	1.0016	1.0278	1.0352	.9942	.9967
1.700	.205E+08	1.0004	1.3444	.7978	.2084	.6576	.3173	.7444	1.0022	1.0287	1.0377	.9927	.9957
1.750	.200E+08	1.0004	1.3429	.7897	.1933	.6451	.3000	.7171	1.0028	1.0290	1.0402	.9906	.9943
1.800	.195E+08	1.0004	1.3416	.7817	.1792	.6327	.2836	.6900	1.0035	1.0294	1.0427	.9886	.9929
1.850	.190E+08	1.0004	1.3404	.7737	.1659	.6205	.2678	.6630	1.0042	1.0294	1.0452	.9863	.9913
1.900	.185E+08	1.0003	1.3393	.7659	.1536	.6084	.2528	.6363	1.0050	1.0293	1.0477	.9838	.9896
1.950	.179E+08	1.0003	1.3385	.7581	.1421	.5965	.2385	.6098	1.0058	1.0286	1.0502	.9809	.9875
2.000	.174E+08	1.0003	1.3378	.7504	.1313	.5848	.2249	.5837	1.0067	1.0275	1.0526	.9776	.9850

TAPLE II. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.89634E-04	.46160E-03	.7098
.050	1.3681	.89632E-04	.46147E-03	.6896
.100	1.3842	.89545E-04	.46109E-03	.6896
.150	1.3923	.89400E-04	.46045E-03	.6897
.200	1.3838	.89198E-04	.45956E-03	.6898
.250	1.3903	.88940E-04	.45843E-03	.6899
.300	1.3838	.88628E-04	.45706E-03	.6900
.350	1.3860	.88263E-04	.45547E-03	.6902
.400	1.3891	.87847E-04	.45365E-03	.6904
.450	1.3855	.87383E-04	.45163E-03	.6906
.500	1.3833	.86872E-04	.44941E-03	.6908
.550	1.3814	.86318E-04	.44701E-03	.6911
.600	1.3834	.85722E-04	.44444E-03	.6914
.650	1.3797	.85088E-04	.44174E-03	.6917
.700	1.3797	.84418E-04	.43902E-03	.6919
.750	1.3777	.83716E-04	.43617E-03	.6921
.800	1.3797	.82984E-04	.43322E-03	.6924
.850	1.3775	.82225E-04	.43017E-03	.6927
.900	1.3761	.81442E-04	.42704E-03	.6930
.950	1.3740	.80637E-04	.42383E-03	.6933
1.000	1.3721	.79814E-04	.42057E-03	.6937
1.050	1.3715	.78974E-04	.41726E-03	.6941
1.100	1.3686	.78122E-04	.41392E-03	.6945
1.150	1.3660	.77258E-04	.41054E-03	.6949
1.200	1.3643	.76385E-04	.40716E-03	.6953
1.250	1.3633	.75505E-04	.40369E-03	.6959
1.300	1.3633	.74620E-04	.39991E-03	.6970
1.350	1.3580	.73732E-04	.39612E-03	.6980
1.400	1.3571	.72841E-04	.39235E-03	.6990
1.450	1.3549	.71949E-04	.38860E-03	.6998
1.500	1.3527	.71058E-04	.38488E-03	.7006
1.550	1.3511	.70168E-04	.38119E-03	.7012
1.600	1.3491	.69281E-04	.37752E-03	.7017
1.650	1.3479	.68397E-04	.37390E-03	.7021
1.700	1.3461	.67517E-04	.37032E-03	.7022
1.750	1.3428	.66640E-04	.36677E-03	.7020
1.800	1.3432	.65768E-04	.36327E-03	.7016
1.850	1.3419	.64900E-04	.35832E-03	.7037
1.900	1.3416	.64037E-04	.35293E-03	.7065
1.950	1.3397	.63179E-04	.34762E-03	.7090
2.000	1.3390	.62325E-04	.34236E-03	.7112

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. TT = 35.0 K PT = 5.0 ATM RHOT = .398E-02 G/CM3 SVT = 467.465 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9809	1.9733	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.480E+08	.9808	1.9732	.9995	.9979	.9991	.9988	.0895	.9998	.9996	.9996	1.0000	1.0372
.100	.957E+08	.9807	1.9730	.9981	.9914	.9965	.9950	.1780	.9991	.9984	.9985	1.0000	1.0364
.150	.143E+09	.9806	1.9729	.9957	.9809	.9923	.9888	.2647	.9979	.9964	.9967	1.0000	1.0352
.200	.189E+09	.9804	1.9727	.9924	.9664	.9864	.9803	.3488	.9963	.9938	.9942	1.0000	1.0336
.250	.235E+09	.9801	1.9724	.9882	.9485	.9789	.9697	.4294	.9943	.9906	.9911	1.0003	1.0318
.300	.279E+09	.9799	1.9720	.9831	.9268	.9699	.9566	.5058	.9919	.9865	.9873	1.0003	1.0293
.350	.321E+09	.9795	1.9716	.9772	.9024	.9595	.9419	.5775	.9891	.9822	.9830	1.0006	1.0268
.400	.363E+09	.9792	1.9712	.9706	.8754	.9478	.9254	.6441	.9860	.9775	.9781	1.0012	1.0242
.450	.402E+09	.9788	1.9716	.9635	.8459	.9349	.9070	.7049	.9828	.9721	.9728	1.0016	1.0212
.500	.440E+09	.9784	1.9717	.9557	.8149	.9209	.8874	.7601	.9793	.9666	.9670	1.0025	1.0184
.550	.475E+09	.9779	1.9719	.9473	.7825	.9060	.8666	.8094	.9755	.9611	.9608	1.0036	1.0157
.600	.509E+09	.9775	1.9719	.9384	.7489	.8902	.8445	.8524	.9715	.9552	.9542	1.0048	1.0128
.650	.541E+09	.9770	1.9721	.9290	.7149	.8736	.8219	.8896	.9674	.9496	.9474	1.0067	1.0103
.700	.570E+09	.9766	1.9721	.9191	.6805	.8565	.7985	.9209	.9631	.9440	.9404	1.0087	1.0079
.750	.598E+09	.9762	1.9721	.9089	.6462	.8388	.7745	.9465	.9587	.9384	.9332	1.0110	1.0056
.800	.624E+09	.9757	1.9720	.8984	.6122	.8207	.7503	.9667	.9542	.9332	.9258	1.0139	1.0037
.850	.647E+09	.9753	1.9717	.8876	.5788	.8024	.7259	.9819	.9496	.9283	.9183	1.0173	1.0022
.900	.669E+09	.9749	1.9712	.8766	.5462	.7839	.7016	.9922	.9450	.9238	.9108	1.0211	1.0010
.950	.689E+09	.9745	1.9706	.8654	.5146	.7652	.6773	.9983	.9403	.9198	.9033	1.0256	1.0004
1.000	.707E+09	.9741	1.9698	.8541	.4840	.7466	.6533	1.0002	.9356	.9162	.8959	1.0305	1.0002
1.050	.724E+09	.9738	1.9687	.8426	.4545	.7280	.6294	.9982	.9309	.9129	.8885	1.0358	1.0003
1.100	.739E+09	.9735	1.9674	.8311	.4264	.7095	.6060	.9932	.9262	.9104	.8812	1.0418	1.0011
1.150	.752E+09	.9732	1.9660	.8196	.3996	.6912	.5832	.9853	.9216	.9085	.8740	1.0485	1.0025
1.200	.764E+09	.9730	1.9645	.8080	.3741	.6732	.5608	.9747	.9170	.9072	.8670	1.0558	1.0044
1.250	.774E+09	.9727	1.9628	.7965	.3500	.6554	.5389	.9619	.9125	.9065	.8602	1.0636	1.0068
1.300	.783E+09	.9725	1.9611	.7951	.3271	.6379	.5176	.9471	.9081	.9063	.8536	1.0720	1.0099

SATURATION BOUNDARY REACHED.

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.19442E-04	.72465E-04	.8131
.050	1.7253	.19381E-04	.72223E-04	.8133
.100	1.7089	.19335E-04	.72035E-04	.8135
.150	1.7153	.19258E-04	.71725E-04	.8139
.200	1.7171	.19152E-04	.71293E-04	.8144
.250	1.7271	.19017E-04	.70745E-04	.8152
.300	1.7043	.18854E-04	.70075E-04	.8161
.350	1.7170	.18666E-04	.69297E-04	.8174
.400	1.7175	.16454E-04	.68414E-04	.8189
.450	1.7017	.18219E-04	.67423E-04	.8206
.500	1.7119	.17963E-04	.66344E-04	.8223
.550	1.7112	.17689E-04	.65364E-04	.8221
.600	1.7031	.17397E-04	.64307E-04	.8219
.650	1.7096	.17091E-04	.63183E-04	.8219
.700	1.7040	.16772E-04	.61994E-04	.8221
.750	1.7005	.16441E-04	.60748E-04	.8226
.800	1.7010	.16101E-04	.59454E-04	.8233
.850	1.6998	.15755E-04	.58118E-04	.8244
.900	1.6975	.15402E-04	.56750E-04	.8258
.950	1.6971	.15046E-04	.55390E-04	.8270
1.000	1.6942	.14688E-04	.54010E-04	.8286
1.050	1.6871	.14328E-04	.52808E-04	.8276
1.100	1.6890	.13969E-04	.51551E-04	.8277
1.150	1.6869	.13611E-04	.50239E-04	.8290
1.200	1.6835	.13256E-04	.48883E-04	.8316
1.250	1.6799	.12905E-04	.47492E-04	.8354
1.300	1.6766	.12557E-04	.46076E-04	.8405

SATURATION BOUNDARY REACHED.

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. TT = 40.0 K PT = 5.0 ATM RHOT = .334E-02 G/CM3 SVT = 509.634 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9199	1.8676	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.395E+08	.9198	1.8676	.9995	.9979	.9991	.9988	.0894	.9998	.9996	.9996	1.0000	1.0360
.100	.788E+08	.9198	1.8675	.9981	.9914	.9966	.9950	.1778	.9991	.9984	.9986	.9999	1.0352
.150	.118E+09	.9196	1.8674	.9958	.9811	.9923	.9889	.2645	.9981	.9966	.9968	1.0001	1.0343
.200	.156E+09	.9195	1.8673	.9926	.9666	.9864	.9804	.3485	.9966	.9940	.9943	1.0001	1.0327
.250	.193E+09	.9193	1.8671	.9885	.9485	.9789	.9695	.4290	.9947	.9906	.9912	1.0001	1.0308
.300	.229E+09	.9190	1.8670	.9836	.9272	.9700	.9568	.5055	.9924	.9869	.9874	1.0004	1.0288
.350	.265E+09	.9187	1.8667	.9779	.9028	.9596	.9420	.5773	.9898	.9826	.9831	1.0007	1.0264
.400	.298E+09	.9184	1.8664	.9714	.8756	.9479	.9252	.6437	.9869	.9777	.9782	1.0010	1.0236
.450	.331E+09	.9181	1.8660	.9643	.8463	.9350	.9069	.7047	.9836	.9725	.9729	1.0016	1.0208
.500	.361E+09	.9177	1.8656	.9565	.8154	.9210	.8874	.7599	.9801	.9672	.9671	1.0025	1.0181
.550	.390E+09	.9174	1.8651	.9481	.7829	.9061	.8664	.8090	.9764	.9616	.9609	1.0034	1.0152
.600	.418E+09	.9170	1.8646	.9392	.7495	.8903	.8445	.8521	.9725	.9560	.9544	1.0048	1.0125
.650	.444E+09	.9166	1.8641	.9299	.7155	.8738	.8218	.8893	.9684	.9504	.9476	1.0065	1.0100
.700	.468E+09	.9162	1.8634	.9201	.6811	.8567	.7983	.9206	.9641	.9448	.9406	1.0085	1.0074
.750	.490E+09	.9158	1.8628	.9099	.6470	.8390	.7745	.9464	.9598	.9396	.9334	1.0110	1.0055
.800	.510E+09	.9155	1.8624	.8996	.6129	.8210	.7501	.9666	.9554	.9342	.9261	1.0137	1.0035
.850	.529E+09	.9151	1.8621	.8889	.5794	.8026	.7256	.9817	.9510	.9292	.9186	1.0168	1.0020
.900	.547E+09	.9148	1.8618	.8781	.5467	.7840	.7012	.9922	.9465	.9246	.9110	1.0206	1.0010
.950	.563E+09	.9144	1.8614	.8671	.5149	.7653	.6767	.9981	.9421	.9203	.9034	1.0247	1.0002
1.000	.577E+09	.9141	1.8611	.8559	.4841	.7465	.6525	1.0000	.9376	.9164	.8959	1.0293	1.0000
1.050	.590E+09	.9138	1.8606	.8446	.4545	.7278	.6286	.9982	.9331	.9129	.8883	1.0345	1.0002
1.100	.602E+09	.9136	1.8601	.8333	.4262	.7092	.6051	.9932	.9287	.9100	.8808	1.0403	1.0010
1.150	.612E+09	.9133	1.8595	.8219	.3992	.6907	.5820	.9851	.9243	.9075	.8734	1.0465	1.0023
1.200	.621E+09	.9131	1.8589	.8106	.3735	.6724	.5596	.9745	.9199	.9057	.8661	1.0535	1.0042
1.250	.629E+09	.9129	1.8581	.7992	.3491	.6544	.5376	.9616	.9156	.9043	.8589	1.0609	1.0065
1.300	.636E+09	.9127	1.8572	.7879	.3261	.6367	.5163	.9468	.9113	.9036	.8518	1.0691	1.0096
1.350	.642E+09	.9126	1.8562	.7766	.3044	.6192	.4955	.9302	.9072	.9034	.8449	1.0777	1.0130
1.400	.648E+09	.9124	1.8552	.7654	.2840	.6022	.4755	.9123	.9031	.9038	.8382	1.0870	1.0171
1.450	.652E+09	.9123	1.8541	.7543	.2648	.5855	.4560	.8931	.8991	.9047	.8317	1.0967	1.0217
1.500	.655E+09	.9122	1.8530	.7434	.2469	.5692	.4374	.8733	.8951	.9064	.8253	1.1074	1.0271
1.550	.658E+09	.9122	1.8518	.7325	.2301	.5533	.4193	.8525	.8913	.9083	.8191	1.1183	1.0328
1.600	.661E+09	.9121	1.8507	.7219	.2144	.5378	.4020	.8313	.8876	.9111	.8132	1.1300	1.0393
1.650	.662E+09	.9120	1.8496	.7113	.1997	.5227	.3853	.8097	.8840	.9143	.8074	1.1422	1.0462
1.700	.663E+09	.9120	1.8485	.7009	.1860	.5081	.3693	.7879	.8805	.9182	.8018	1.1551	1.0538

SATURATION BOUNDARY REACHED.

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.21553E-04	.79421E-04	.7683
.050	1.7137	.21489E-04	.79158E-04	.7685
.100	1.6975	.21440E-04	.78955E-04	.7687
.150	1.7263	.21359E-04	.78623E-04	.7690
.200	1.7068	.21246E-04	.78159E-04	.7694
.250	1.7045	.21102E-04	.77570E-04	.7699
.300	1.7170	.20930E-04	.76864E-04	.7706
.350	1.7093	.20730E-04	.76043E-04	.7714
.400	1.7028	.20504E-04	.75150E-04	.7718
.450	1.7039	.20253E-04	.74174E-04	.7725
.500	1.7080	.19981E-04	.73093E-04	.7733
.550	1.7004	.19688E-04	.71953E-04	.7740
.600	1.7023	.19377E-04	.70742E-04	.7748
.650	1.7025	.19050E-04	.69464E-04	.7757
.700	1.6965	.18709E-04	.68127E-04	.7768
.750	1.7010	.18355E-04	.66743E-04	.7780
.800	1.6924	.17992E-04	.65315E-04	.7793
.850	1.6939	.17619E-04	.63869E-04	.7803
.900	1.6941	.17239E-04	.62466E-04	.7805
.950	1.6913	.16855E-04	.61072E-04	.7803
1.000	1.6904	.16466E-04	.59646E-04	.7804
1.050	1.6892	.16076E-04	.58194E-04	.7808
1.100	1.6891	.15685E-04	.56723E-04	.7814
1.150	1.6862	.15295E-04	.55238E-04	.7824
1.200	1.6869	.14906E-04	.53749E-04	.7836
1.250	1.6838	.14520E-04	.52260E-04	.7851
1.300	1.6840	.14137E-04	.50857E-04	.7857
1.350	1.6799	.13759E-04	.49427E-04	.7871
1.400	1.6799	.13386E-04	.47973E-04	.7895
1.450	1.6767	.13019E-04	.46559E-04	.7917
1.500	1.6791	.12658E-04	.45248E-04	.7930
1.550	1.6722	.12304E-04	.43955E-04	.7945
1.600	1.6741	.11957E-04	.42687E-04	.7963
1.650	1.6714	.11617E-04	.41444E-04	.7984
1.700	1.6707	.11285E-04	.40226E-04	.8008

SATURATION BOUNDARY REACHED.

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. TT = 60.0 K PT = 5.0 ATM RHOT = .209E-02 G/CM3 SVT = 634.456 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9774	1.7017	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.226E+08	.9774	1.7027	.9996	.9979	.9992	.9987	.0885	.9999	.9996	.9997	.9999	1.0259
.100	.452E+08	.9773	1.7028	.9985	.9916	.9968	.9949	.1761	.9995	.9986	.9987	.9999	1.0254
.150	.674E+08	.9773	1.7035	.9966	.9815	.9927	.9889	.2621	.9988	.9970	.9972	1.0000	1.0248
.200	.893E+08	.9771	1.7046	.9940	.9674	.9871	.9803	.3455	.9979	.9948	.9950	1.0000	1.0239
.250	.111E+09	.9770	1.7059	.9906	.9498	.9800	.9696	.4258	.9967	.9920	.9923	1.0002	1.0229
.300	.131E+09	.9769	1.7077	.9865	.9287	.9714	.9566	.5020	.9953	.9886	.9889	1.0003	1.0215
.350	.151E+09	.9766	1.7090	.9817	.9047	.9615	.9417	.5737	.9936	.9847	.9850	1.0005	1.0200
.400	.171E+09	.9764	1.7108	.9762	.8780	.9502	.9249	.6404	.9917	.9803	.9806	1.0007	1.0183
.450	.189E+09	.9762	1.7126	.9700	.8489	.9377	.9064	.7015	.9894	.9754	.9757	1.0010	1.0163
.500	.206E+09	.9759	1.7145	.9632	.8180	.9241	.8866	.7571	.9870	.9703	.9703	1.0016	1.0143
.550	.223E+09	.9756	1.7165	.9559	.7856	.9094	.8654	.8066	.9842	.9649	.9644	1.0023	1.0123
.600	.238E+09	.9753	1.7183	.9478	.7522	.8939	.8433	.8503	.9813	.9595	.9582	1.0034	1.0103
.650	.252E+09	.9750	1.7201	.9392	.7180	.8775	.8202	.8879	.9781	.9538	.9517	1.0046	1.0083
.700	.266E+09	.9747	1.7217	.9302	.6836	.8605	.7965	.9196	.9747	.9462	.9449	1.0063	1.0064
.750	.278E+09	.9744	1.7232	.9209	.6491	.8430	.7724	.9457	.9712	.9427	.9378	1.0083	1.0047
.800	.289E+09	.9741	1.7245	.9109	.6148	.8249	.7478	.9662	.9674	.9372	.9305	1.0106	1.0032
.850	.299E+09	.9738	1.7256	.9007	.5812	.8065	.7232	.9817	.9636	.9321	.9231	1.0134	1.0019
.900	.308E+09	.9735	1.7265	.8902	.5482	.7880	.6984	.9921	.9596	.9271	.9156	1.0166	1.0009
.950	.316E+09	.9732	1.7272	.8794	.5161	.7692	.6739	.9982	.9555	.9225	.9080	1.0203	1.0004
1.000	.324E+09	.9730	1.7278	.8685	.4851	.7504	.6494	1.0000	.9514	.9182	.9004	1.0244	1.0000
1.050	.330E+09	.9727	1.7282	.8574	.4553	.7315	.6254	.9982	.9472	.9145	.8929	1.0292	1.0003
1.100	.336E+09	.9724	1.7285	.8462	.4268	.7128	.6018	.9931	.9430	.9112	.8853	1.0345	1.0010
1.150	.341E+09	.9722	1.7286	.8349	.3995	.6942	.5786	.9850	.9388	.9084	.8778	1.0404	1.0022
1.200	.345E+09	.9720	1.7286	.8235	.3737	.6758	.5560	.9742	.9346	.9062	.8705	1.0468	1.0039
1.250	.348E+09	.9718	1.7286	.8122	.3492	.6577	.5340	.9612	.9305	.9044	.8632	1.0539	1.0062
1.300	.351E+09	.9716	1.7284	.8008	.3260	.6398	.5127	.9463	.9264	.9033	.8560	1.0616	1.0091
1.350	.353E+09	.9714	1.7282	.7896	.3042	.6222	.4919	.9296	.9223	.9026	.8490	1.0697	1.0123
1.400	.355E+09	.9712	1.7280	.7784	.2836	.6050	.4718	.9115	.9183	.9025	.8421	1.0785	1.0163
1.450	.357E+09	.9711	1.7277	.7672	.2643	.5881	.4524	.8923	.9144	.9030	.8354	1.0879	1.0208
1.500	.358E+09	.9709	1.7274	.7562	.2462	.5716	.4336	.8721	.9106	.9038	.8288	1.0978	1.0257
1.550	.358E+09	.9708	1.7270	.7453	.2293	.5555	.4156	.8513	.9069	.9055	.8224	1.1084	1.0314
1.600	.358E+09	.9707	1.7268	.7345	.2135	.5398	.3983	.8299	.9032	.9075	.8162	1.1195	1.0376
1.650	.358E+09	.9706	1.7265	.7239	.1988	.5245	.3816	.8082	.8997	.9101	.8101	1.1313	1.0443
1.700	.358E+09	.9705	1.7262	.7134	.1850	.5096	.3656	.7862	.8962	.9131	.8042	1.1435	1.0516
1.750	.357E+09	.9704	1.7259	.7031	.1722	.4951	.3503	.7642	.8928	.9168	.7984	1.1565	1.0595
1.800	.356E+09	.9704	1.7256	.6929	.1603	.4811	.3355	.7421	.8896	.9208	.7928	1.1699	1.0678
1.850	.355E+09	.9703	1.7253	.6829	.1492	.4674	.3215	.7202	.8864	.9255	.7874	1.1839	1.0768
1.900	.354E+09	.9703	1.7249	.6731	.1389	.4542	.3080	.6984	.8833	.9306	.7821	1.1985	1.0863
1.950	.352E+09	.9703	1.7246	.6635	.1293	.4414	.2952	.6771	.8803	.9364	.7771	1.2139	1.0965
2.000	.351E+09	.9702	1.7243	.6540	.1205	.4290	.2829	.6560	.8774	.9425	.7721	1.2297	1.1070

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.29364E-04	.11279E-03	.6931
.050	1.6368	.29287E-04	.11242E-03	.6931
.100	1.6554	.29230E-04	.11214E-03	.6931
.150	1.6718	.29135E-04	.11169E-03	.6932
.200	1.6664	.29004E-04	.11106E-03	.6933
.250	1.6740	.28836E-04	.11026E-03	.6934
.300	1.6651	.28633E-04	.10929E-03	.6936
.350	1.6705	.28397E-04	.10817E-03	.6939
.400	1.6692	.28128E-04	.10689E-03	.6943
.450	1.6679	.27829E-04	.10547E-03	.6949
.500	1.6738	.27501E-04	.10254E-03	.7050
.550	1.6718	.27147E-04	.10100E-03	.7052
.600	1.6774	.26769E-04	.99351E-04	.7056
.650	1.6758	.26369E-04	.97622E-04	.7060
.700	1.6786	.25949E-04	.95839E-04	.7065
.750	1.6800	.25513E-04	.93993E-04	.7071
.800	1.6786	.25061E-04	.92104E-04	.7078
.850	1.6808	.24598E-04	.90185E-04	.7085
.900	1.6793	.24124E-04	.88234E-04	.7093
.950	1.6812	.23642E-04	.86195E-04	.7109
1.000	1.6781	.23154E-04	.84145E-04	.7124
1.050	1.6810	.22662E-04	.81713E-04	.7175
1.100	1.6811	.22168E-04	.79727E-04	.7188
1.150	1.6795	.21672E-04	.77752E-04	.7201
1.200	1.6797	.21177E-04	.75795E-04	.7214
1.250	1.6800	.20684E-04	.73862E-04	.7227
1.300	1.6807	.20194E-04	.71958E-04	.7240
1.350	1.6769	.19708E-04	.70095E-04	.7251
1.400	1.6778	.19226E-04	.68264E-04	.7261
1.450	1.6775	.18750E-04	.66474E-04	.7270
1.500	1.6742	.18280E-04	.64730E-04	.7277
1.550	1.6777	.17817E-04	.63027E-04	.7282
1.600	1.6749	.17361E-04	.61365E-04	.7286
1.650	1.6757	.16913E-04	.59688E-04	.7296
1.700	1.6733	.16473E-04	.58038E-04	.7306
1.750	1.6753	.16041E-04	.56430E-04	.7316
1.800	1.6717	.15618E-04	.54864E-04	.7324
1.850	1.6733	.15203E-04	.53339E-04	.7332
1.900	1.6721	.14798E-04	.51858E-04	.7338
1.950	1.6743	.14402E-04	.50421E-04	.7344
2.000	1.6715	.14015E-04	.49010E-04	.7351

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

0. TT = 80.0 K PT = 5.0 ATM RHOT = .155E-02 G/CM3 SVT = 715.337 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9929	1.5716	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.153E+08	.9929	1.5730	.9997	.9981	.9993	.9988	.0869	1.0000	.9998	.9998	1.0000	1.0071
.100	.304E+08	.9929	1.5739	.9989	.9922	.9972	.9950	.1730	.9999	.9992	.9992	1.0000	1.0070
.150	.454E+08	.9928	1.5754	.9976	.9826	.9938	.9889	.2575	.9999	.9982	.9983	1.0000	1.0070
.200	.602E+08	.9927	1.5774	.9958	.9694	.9890	.9803	.3398	.9998	.9968	.9969	1.0000	1.0069
.250	.745E+08	.9926	1.5801	.9934	.9526	.9829	.9694	.4190	.9996	.9949	.9952	1.0000	1.0067
.300	.885E+08	.9925	1.5833	.9906	.9326	.9754	.9565	.4947	.9994	.9927	.9930	1.0001	1.0067
.350	.102E+09	.9924	1.5870	.9871	.9096	.9667	.9414	.5661	.9992	.9900	.9904	1.0001	1.0064
.400	.115E+09	.9922	1.5913	.9832	.8838	.9568	.9244	.6327	.9988	.9868	.9874	1.0001	1.0060
.450	.127E+09	.9921	1.5960	.9788	.8557	.9456	.9057	.6942	.9984	.9833	.9839	1.0002	1.0057
.500	.139E+09	.9919	1.6012	.9738	.8256	.9334	.8855	.7503	.9978	.9794	.9800	1.0004	1.0053
.550	.150E+09	.9917	1.6068	.9683	.7938	.9200	.8639	.8006	.9971	.9750	.9757	1.0005	1.0047
.600	.160E+09	.9915	1.6126	.9622	.7607	.9057	.8411	.8451	.9963	.9703	.9709	1.0008	1.0042
.650	.169E+09	.9913	1.6188	.9557	.7266	.8904	.8174	.8837	.9953	.9652	.9657	1.0012	1.0035
.700	.178E+09	.9910	1.6251	.9486	.6921	.8743	.7930	.9164	.9940	.9600	.9600	1.0018	1.0029
.750	.186E+09	.9908	1.6314	.9411	.6571	.8575	.7679	.9432	.9926	.9543	.9540	1.0025	1.0021
.800	.194E+09	.9906	1.6378	.9330	.6224	.8401	.7426	.9643	.9910	.9487	.9476	1.0035	1.0015
.850	.200E+09	.9903	1.6440	.9245	.5880	.8221	.7171	.9807	.9891	.9430	.9409	1.0049	1.0010
.900	.206E+09	.9901	1.6501	.9156	.5542	.8036	.6916	.9917	.9869	.9373	.9338	1.0066	1.0005
.950	.211E+09	.9899	1.6559	.9062	.5212	.7849	.6661	.9979	.9846	.9316	.9266	1.0085	1.0000
1.000	.216E+09	.9896	1.6613	.8964	.4894	.7660	.6410	1.0000	.9820	.9264	.9191	1.0112	1.0000
1.050	.220E+09	.9894	1.6663	.8863	.4587	.7469	.6163	.9982	.9792	.9214	.9116	1.0143	1.0002
1.100	.223E+09	.9892	1.6708	.8759	.4293	.7278	.5921	.9928	.9762	.9167	.9040	1.0179	1.0007
1.150	.226E+09	.9890	1.6749	.8653	.4013	.7088	.5684	.9843	.9730	.9124	.8963	1.0220	1.0015
1.200	.228E+09	.9888	1.6785	.8544	.3747	.6899	.5454	.9732	.9697	.9088	.8887	1.0269	1.0028
1.250	.230E+09	.9886	1.6816	.8434	.3497	.6713	.5231	.9598	.9662	.9057	.8811	1.0325	1.0047
1.300	.231E+09	.9884	1.6842	.8322	.3260	.6529	.5015	.9443	.9627	.9032	.8736	1.0386	1.0069
1.350	.232E+09	.9882	1.6864	.8210	.3038	.6349	.4808	.9273	.9591	.9015	.8663	1.0456	1.0099
1.400	.233E+09	.9880	1.6882	.8098	.2829	.6171	.4606	.9088	.9554	.9002	.8591	1.0530	1.0132
1.450	.233E+09	.9879	1.6897	.7986	.2633	.5998	.4413	.8892	.9518	.8996	.8520	1.0613	1.0172
1.500	.234E+09	.9877	1.6909	.7873	.2451	.5829	.4227	.8687	.9481	.8997	.8452	1.0701	1.0218
1.550	.233E+09	.9876	1.6918	.7762	.2281	.5663	.4049	.8478	.9445	.9006	.8385	1.0799	1.0272
1.600	.233E+09	.9875	1.6925	.7652	.2122	.5503	.3878	.8263	.9409	.9021	.8320	1.0902	1.0330
1.650	.232E+09	.9874	1.6929	.7542	.1974	.5346	.3714	.8043	.9373	.9041	.8257	1.1011	1.0394
1.700	.232E+09	.9872	1.6933	.7434	.1837	.5194	.3557	.7822	.9338	.9066	.8196	1.1125	1.0463
1.750	.231E+09	.9871	1.6935	.7327	.1709	.5046	.3407	.7602	.9304	.9099	.8137	1.1249	1.0540
1.800	.230E+09	.9871	1.6936	.7222	.1590	.4902	.3263	.7381	.9271	.9137	.8079	1.1376	1.0622
1.850	.229E+09	.9870	1.6937	.7118	.1480	.4763	.3126	.7162	.9238	.9181	.8024	1.1511	1.0709
1.900	.227E+09	.9869	1.6937	.7016	.1377	.4628	.2994	.6946	.9206	.9229	.7970	1.1651	1.0802
1.950	.226E+09	.9868	1.6936	.6915	.1282	.4497	.2869	.6733	.9175	.9284	.7918	1.1798	1.0902
2.000	.224E+09	.9868	1.6935	.6817	.1194	.4371	.2749	.6522	.9145	.9343	.7867	1.1949	1.1005

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.36269E-04	.14835E-03	.7009
.050	1.5680	.36182E-04	.14775E-03	.7009
.100	1.5576	.36125E-04	.14736E-03	.7009
.150	1.5683	.36030E-04	.14671E-03	.7009
.200	1.5654	.35899E-04	.14581E-03	.7010
.250	1.5663	.35730E-04	.14465E-03	.7011
.300	1.5749	.35525E-04	.14325E-03	.7013
.350	1.5729	.35284E-04	.14181E-03	.7006
.400	1.5753	.35007E-04	.14030E-03	.6992
.450	1.5808	.34697E-04	.13862E-03	.6977
.500	1.5876	.34353E-04	.13676E-03	.6961
.550	1.5903	.33977E-04	.13473E-03	.6946
.600	1.5965	.33572E-04	.13255E-03	.6932
.650	1.6010	.33137E-04	.13023E-03	.6919
.700	1.6097	.32676E-04	.12778E-03	.6907
.750	1.6113	.32190E-04	.12522E-03	.6898
.800	1.6204	.31681E-04	.12255E-03	.6891
.850	1.6272	.31153E-04	.11990E-03	.6883
.900	1.6312	.30608E-04	.11723E-03	.6874
.950	1.6344	.30049E-04	.11451E-03	.6870
1.000	1.6435	.29478E-04	.11174E-03	.6869
1.050	1.6477	.28897E-04	.10895E-03	.6872
1.100	1.6502	.28311E-04	.10616E-03	.6879
1.150	1.6536	.27721E-04	.10336E-03	.6891
1.200	1.6583	.27129E-04	.99962E-04	.6908
1.250	1.6620	.26537E-04	.97407E-04	.6954
1.300	1.6628	.25948E-04	.94892E-04	.6961
1.350	1.6671	.25363E-04	.92425E-04	.6970
1.400	1.6652	.24782E-04	.90009E-04	.6980
1.450	1.6684	.24208E-04	.87646E-04	.6991
1.500	1.6685	.23641E-04	.85312E-04	.7005
1.550	1.6727	.23081E-04	.83007E-04	.7021
1.600	1.6713	.22531E-04	.80556E-04	.7056
1.650	1.6699	.21989E-04	.78406E-04	.7070
1.700	1.6698	.21456E-04	.76316E-04	.7084
1.750	1.6732	.20934E-04	.74286E-04	.7096
1.800	1.6708	.20421E-04	.72315E-04	.7108
1.850	1.6717	.19918E-04	.70404E-04	.7119
1.900	1.6706	.19425E-04	.68548E-04	.7129
1.950	1.6728	.18943E-04	.66749E-04	.7138
2.000	1.6694	.18472E-04	.65005E-04	.7146

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. TT = 100.0 K PT = 5.0 ATM RHOT = .123E-02 G/CM3 SVT = 774.990 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9987	1.4584	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.112E+08	.9987	1.4600	.9998	.9983	.9994	.9988	.0858	1.0000	1.0000	.9999	1.0001	.9948
.100	.224E+08	.9987	1.4607	.9992	.9928	.9977	.9951	.1709	1.0002	.9998	.9997	1.0001	.9949
.150	.334E+08	.9987	1.4618	.9981	.9838	.9949	.9889	.2545	1.0003	.9994	.9994	1.0001	.9951
.200	.442E+08	.9986	1.4635	.9966	.9713	.9910	.9803	.3359	1.0006	.9988	.9989	1.0000	.9953
.250	.547E+08	.9985	1.4656	.9947	.9557	.9860	.9695	.4144	1.0009	.9982	.9983	1.0001	.9957
.300	.649E+08	.9984	1.4682	.9925	.9367	.9799	.9563	.4894	1.0013	.9971	.9975	.9999	.9959
.350	.747E+08	.9983	1.4713	.9898	.9151	.9727	.9411	.5604	1.0018	.9960	.9965	.9999	.9964
.400	.841E+08	.9982	1.4750	.9867	.8909	.9644	.9242	.6269	1.0023	.9947	.9953	.9999	.9969
.450	.930E+08	.9981	1.4792	.9832	.8641	.9552	.9052	.6884	1.0029	.9929	.9939	.9997	.9972
.500	.101E+09	.9980	1.4839	.9793	.8354	.9449	.8848	.7447	1.0035	.9910	.9922	.9996	.9977
.550	.109E+09	.9978	1.4891	.9750	.8049	.9337	.8629	.7954	1.0041	.9887	.9902	.9994	.9982
.600	.117E+09	.9977	1.4950	.9704	.7731	.9215	.8399	.8405	1.0047	.9861	.9878	.9993	.9987
.650	.123E+09	.9975	1.5014	.9654	.7400	.9084	.8156	.8797	1.0053	.9830	.9852	.9990	.9990
.700	.129E+09	.9973	1.5083	.9600	.7061	.8945	.7905	.9131	1.0059	.9795	.9821	.9987	.9993
.750	.135E+09	.9972	1.5158	.9542	.6718	.8797	.7648	.9408	1.0065	.9756	.9787	.9984	.9995
.800	.140E+09	.9970	1.5239	.9481	.6372	.8642	.7386	.9630	1.0070	.9713	.9748	.9982	.9998
.850	.145E+09	.9968	1.5324	.9416	.6026	.8480	.7121	.9796	1.0074	.9665	.9705	.9978	.9998
.900	.148E+09	.9966	1.5414	.9348	.5685	.8311	.6854	.9912	1.0076	.9614	.9657	.9977	1.0000
.950	.152E+09	.9964	1.5507	.9278	.5349	.8136	.6589	.9979	1.0078	.9560	.9605	.9977	1.0001
1.000	.155E+09	.9963	1.5604	.9199	.5020	.7957	.6324	1.0000	1.0077	.9502	.9548	.9976	1.0000
1.050	.157E+09	.9961	1.5703	.9119	.4700	.7773	.6063	.9979	1.0075	.9441	.9487	.9978	.9999
1.100	.159E+09	.9959	1.5802	.9036	.4394	.7586	.5809	.9923	1.0070	.9381	.9422	.9985	1.0002
1.150	.161E+09	.9957	1.5901	.8949	.4099	.7397	.5558	.9832	1.0063	.9320	.9353	.9994	1.0004
1.200	.162E+09	.9956	1.5998	.8858	.3818	.7206	.5315	.9711	1.0053	.9258	.9281	1.0007	1.0006
1.250	.163E+09	.9954	1.6092	.8764	.3552	.7015	.5081	.9567	1.0040	.9201	.9207	1.0027	1.0014
1.300	.163E+09	.9953	1.6182	.8667	.3301	.6825	.4854	.9401	1.0025	.9147	.9131	1.0052	1.0024
1.350	.164E+09	.9951	1.6265	.8567	.3065	.6636	.4636	.9215	1.0007	.9096	.9055	1.0082	1.0036
1.400	.164E+09	.9950	1.6343	.8465	.2845	.6450	.4428	.9010	.9987	.9053	.8978	1.0122	1.0055
1.450	.164E+09	.9948	1.6414	.8360	.2639	.6266	.4229	.8811	.9964	.9016	.8901	1.0169	1.0079
1.500	.163E+09	.9947	1.6477	.8254	.2448	.6086	.4038	.8594	.9939	.8987	.8825	1.0224	1.0108
1.550	.163E+09	.9946	1.6533	.8147	.2271	.5911	.3858	.8373	.9913	.8966	.8751	1.0289	1.0145
1.600	.162E+09	.9944	1.6582	.8039	.2106	.5740	.3685	.8148	.9885	.8952	.8678	1.0360	1.0187
1.650	.161E+09	.9943	1.6624	.7931	.1954	.5573	.3521	.7920	.9856	.8947	.8608	1.0440	1.0235
1.700	.160E+09	.9942	1.6659	.7822	.1813	.5411	.3366	.7694	.9826	.8950	.8539	1.0529	1.0291
1.750	.159E+09	.9941	1.6689	.7714	.1683	.5255	.3219	.7469	.9796	.8963	.8473	1.0627	1.0355
1.800	.158E+09	.9940	1.6714	.7607	.1563	.5103	.3078	.7245	.9765	.8983	.8409	1.0733	1.0425
1.850	.157E+09	.9940	1.6734	.7500	.1453	.4956	.2945	.7024	.9735	.9011	.8348	1.0846	1.0502
1.900	.156E+09	.9939	1.6750	.7395	.1350	.4813	.2818	.6806	.9704	.9046	.8289	1.0967	1.0586
1.950	.155E+09	.9938	1.6763	.7291	.1255	.4676	.2698	.6593	.9674	.9088	.8232	1.1095	1.0676
2.000	.154E+09	.9937	1.6773	.7188	.1168	.4543	.2583	.6383	.9644	.9137	.8177	1.1229	1.0772

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.42520E-04	.19456E-03	.7092
.050	1.4886	.42425E-04	.19368E-03	.7093
.100	1.4553	.42373E-04	.19327E-03	.7092
.150	1.4603	.42285E-04	.19258E-03	.7089
.200	1.4573	.42163E-04	.19162E-03	.7086
.250	1.4667	.42006E-04	.19040E-03	.7082
.300	1.4603	.41815E-04	.18891E-03	.7076
.350	1.4681	.41590E-04	.18716E-03	.7070
.400	1.4737	.41332E-04	.18516E-03	.7064
.450	1.4720	.41040E-04	.18290E-03	.7056
.500	1.4791	.40715E-04	.18040E-03	.7048
.550	1.4835	.40358E-04	.17767E-03	.7040
.600	1.4909	.39970E-04	.17471E-03	.7032
.650	1.4932	.39551E-04	.17153E-03	.7024
.700	1.5005	.39102E-04	.16815E-03	.7017
.750	1.5079	.38623E-04	.16466E-03	.7007
.800	1.5162	.38117E-04	.16106E-03	.6995
.850	1.5224	.37584E-04	.15729E-03	.6985
.900	1.5328	.37025E-04	.15337E-03	.6978
.950	1.5420	.36443E-04	.14932E-03	.6974
1.000	1.5489	.35839E-04	.14516E-03	.6974
1.050	1.5584	.35215E-04	.14092E-03	.6978
1.100	1.5715	.34574E-04	.13741E-03	.6946
1.150	1.5782	.33919E-04	.13386E-03	.6919
1.200	1.5867	.33253E-04	.13028E-03	.6896
1.250	1.5992	.32579E-04	.12669E-03	.6878
1.300	1.6065	.31900E-04	.12311E-03	.6866
1.350	1.6122	.31218E-04	.11958E-03	.6859
1.400	1.6240	.30539E-04	.11623E-03	.6849
1.450	1.6299	.29861E-04	.11291E-03	.6845
1.500	1.6354	.29189E-04	.10966E-03	.6847
1.550	1.6427	.28525E-04	.10648E-03	.6854
1.600	1.6457	.27870E-04	.10337E-03	.6866
1.650	1.6493	.27225E-04	.10034E-03	.6881
1.700	1.6549	.26592E-04	.97222E-04	.6913
1.750	1.6584	.25971E-04	.94571E-04	.6921
1.800	1.6601	.25361E-04	.92007E-04	.6930
1.850	1.6630	.24765E-04	.89527E-04	.6941
1.900	1.6638	.24181E-04	.87129E-04	.6953
1.950	1.6652	.23611E-04	.84796E-04	.6966
2.000	1.6655	.23052E-04	.82516E-04	.6982

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. TT = 200.0 K PT = 5.0 ATM RHOT = .612E-03 G/CM3 SVT =1057.808 M/SEC

MACH	PE/M	γ	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	1.0033	1.3478	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.473E+07	1.0033	1.3475	.9998	.9983	.9996	.9987	.0859	1.0000	1.0000	1.0001	.9999	.9961
.100	.943E+07	1.0033	1.3474	.9991	.9932	.9983	.9949	.1711	1.0001	1.0002	1.0003	.9999	.9961
.150	.141E+08	1.0033	1.3472	.9979	.9858	.9961	.9889	.2548	1.0001	1.0006	1.0006	1.0000	.9963
.200	.186E+08	1.0032	1.3470	.9962	.9775	.9931	.9803	.3362	1.0002	1.0010	1.0010	1.0000	.9963
.250	.230E+08	1.0032	1.3467	.9941	.9688	.9893	.9693	.4147	1.0003	1.0014	1.0016	.9999	.9964
.300	.273E+08	1.0031	1.3462	.9916	.9614	.9846	.9563	.4897	1.0005	1.0021	1.0024	.9999	.9965
.350	.313E+08	1.0031	1.3458	.9886	.9213	.9792	.9411	.5605	1.0007	1.0028	1.0032	.9998	.9966
.400	.352E+08	1.0030	1.3453	.9853	.8959	.9731	.9241	.6268	1.0009	1.0036	1.0042	.9998	.9968
.450	.388E+08	1.0029	1.3447	.9815	.8743	.9662	.9052	.6882	1.0012	1.0046	1.0053	.9997	.9970
.500	.422E+08	1.0028	1.3442	.9773	.8479	.9587	.8849	.7443	1.0015	1.0058	1.0066	.9997	.9973
.550	.453E+08	1.0027	1.3435	.9728	.8198	.9505	.8630	.7949	1.0018	1.0069	1.0080	.9996	.9975
.600	.482E+08	1.0026	1.3429	.9680	.7905	.9417	.8401	.8398	1.0022	1.0083	1.0095	.9995	.9979
.650	.508E+08	1.0025	1.3423	.9628	.7600	.9323	.8159	.8789	1.0027	1.0096	1.0111	.9993	.9981
.700	.531E+08	1.0024	1.3416	.9574	.7290	.9224	.7910	.9125	1.0032	1.0112	1.0128	.9993	.9986
.750	.551E+08	1.0023	1.3410	.9517	.6972	.9121	.7653	.9402	1.0038	1.0126	1.0147	.9990	.9989
.800	.569E+08	1.0022	1.3405	.9457	.6653	.9013	.7390	.9624	1.0045	1.0142	1.0167	.9987	.9992
.850	.584E+08	1.0021	1.3399	.9396	.6333	.8901	.7124	.9793	1.0052	1.0157	1.0187	.9983	.9995
.900	.596E+08	1.0019	1.3395	.9332	.6015	.8785	.6856	.9911	1.0059	1.0173	1.0208	.9979	.9999
.950	.606E+08	1.0019	1.3391	.9266	.5698	.8666	.6585	.9978	1.0068	1.0185	1.0231	.9971	.9999
1.000	.613E+08	1.0017	1.3389	.9199	.5388	.8545	.6316	1.0000	1.0077	1.0199	1.0254	.9963	1.0000
1.050	.618E+08	1.0016	1.3387	.9130	.5083	.8420	.6047	.9979	1.0086	1.0210	1.0277	.9952	.9999
1.100	.621E+08	1.0015	1.3387	.9060	.4786	.8293	.5782	.9919	1.0097	1.0220	1.0300	.9940	.9997
1.150	.622E+08	1.0014	1.3389	.8989	.4498	.8164	.5520	.9823	1.0108	1.0227	1.0324	.9926	.9994
1.200	.620E+08	1.0013	1.3393	.8917	.4219	.8034	.5262	.9693	1.0120	1.0231	1.0348	.9908	.9988
1.250	.617E+08	1.0012	1.3398	.8844	.3952	.7902	.5012	.9537	1.0132	1.0236	1.0371	.9891	.9983
1.300	.613E+08	1.0011	1.3406	.8771	.3694	.7768	.4766	.9354	1.0145	1.0235	1.0393	.9869	.9974
1.350	.607E+08	1.0010	1.3416	.8697	.3448	.7633	.4527	.9150	1.0159	1.0232	1.0415	.9847	.9964
1.400	.599E+08	1.0009	1.3429	.8623	.3213	.7497	.4296	.8928	1.0173	1.0226	1.0436	.9822	.9954
1.450	.591E+08	1.0008	1.3445	.8548	.2990	.7361	.4072	.8688	1.0188	1.0214	1.0456	.9793	.9938
1.500	.581E+08	1.0007	1.3464	.8473	.2777	.7223	.3855	.8434	1.0203	1.0196	1.0474	.9760	.9920
1.550	.571E+08	1.0007	1.3487	.8398	.2577	.7085	.3647	.8171	1.0219	1.0175	1.0490	.9726	.9900
1.600	.559E+08	1.0006	1.3514	.8323	.2387	.6947	.3446	.7900	1.0235	1.0148	1.0503	.9688	.9877
1.650	.547E+08	1.0005	1.3545	.8249	.2209	.6808	.3254	.7622	1.0251	1.0113	1.0514	.9646	.9850
1.700	.535E+08	1.0004	1.3581	.8174	.2041	.6668	.3069	.7341	1.0268	1.0073	1.0522	.9601	.9820
1.750	.522E+08	1.0004	1.3621	.8099	.1884	.6528	.2895	.7062	1.0285	1.0031	1.0527	.9557	.9791
1.800	.509E+08	1.0003	1.3667	.8025	.1737	.6388	.2727	.6779	1.0302	.9979	1.0528	.9507	.9756
1.850	.496E+08	1.0003	1.3717	.7950	.1599	.6248	.2567	.6500	1.0319	.9921	1.0525	.9456	.9719
1.900	.482E+08	1.0002	1.3774	.7876	.1471	.6107	.2416	.6224	1.0336	.9857	1.0517	.9402	.9680
1.950	.469E+08	1.0002	1.3837	.7802	.1351	.5967	.2272	.5951	1.0353	.9784	1.0504	.9344	.9636
2.000	.455E+08	1.0001	1.3906	.7729	.1241	.5826	.2136	.5684	1.0369	.9707	1.0487	.9286	.9592

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.68423E-04	.37459E-03	.7027
.050	1.3787	.68286E-04	.37403E-03	.7028
.100	1.3488	.68225E-04	.37378E-03	.7028
.150	1.3591	.68124E-04	.37337E-03	.7028
.200	1.3512	.67983E-04	.37280E-03	.7028
.250	1.3481	.67803E-04	.37206E-03	.7028
.300	1.3512	.67586E-04	.37117E-03	.7028
.350	1.3483	.67331E-04	.37014E-03	.7027
.400	1.3491	.67040E-04	.36896E-03	.7027
.450	1.3485	.66716E-04	.36764E-03	.7026
.500	1.3498	.66358E-04	.36620E-03	.7024
.550	1.3465	.65969E-04	.36463E-03	.7021
.600	1.3482	.65550E-04	.36264E-03	.7024
.650	1.3456	.65102E-04	.35984E-03	.7039
.700	1.3475	.64628E-04	.35688E-03	.7055
.750	1.3445	.64129E-04	.35377E-03	.7070
.800	1.3445	.63608E-04	.35054E-03	.7086
.850	1.3438	.63063E-04	.34718E-03	.7100
.900	1.3439	.62499E-04	.34371E-03	.7114
.950	1.3409	.61917E-04	.34014E-03	.7126
1.000	1.3414	.61317E-04	.33649E-03	.7137
1.050	1.3409	.60700E-04	.33275E-03	.7146
1.100	1.3407	.60069E-04	.32895E-03	.7152
1.150	1.3405	.59424E-04	.32508E-03	.7156
1.200	1.3390	.58767E-04	.32116E-03	.7157
1.250	1.3424	.58097E-04	.31719E-03	.7154
1.300	1.3412	.57416E-04	.31318E-03	.7147
1.350	1.3425	.56725E-04	.30914E-03	.7137
1.400	1.3443	.56025E-04	.30507E-03	.7122
1.450	1.3446	.55319E-04	.30097E-03	.7102
1.500	1.3455	.54597E-04	.29685E-03	.7077
1.550	1.3485	.53870E-04	.29030E-03	.7104
1.600	1.3509	.53134E-04	.28370E-03	.7129
1.650	1.3529	.52391E-04	.27708E-03	.7149
1.7	1.3564	.51639E-04	.27045E-03	.7165
1.750	1.3622	.50880E-04	.26380E-03	.7178
1.800	1.3641	.50113E-04	.25714E-03	.7186
1.850	1.3701	.49338E-04	.25046E-03	.7190
1.900	1.3753	.48555E-04	.24378E-03	.7190
1.950	1.3800	.47765E-04	.23710E-03	.7185
2.000	1.3879	.46967E-04	.23041E-03	.7176

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

TT = 300.0 K PT = 5.0 ATM RHOT = .408E-03 G/CM3 SVT =1313.208 M/SEC

MACH	PF/M	γ	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0030	1.3702	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.298E+07	1.0030	1.3696	.9997	.9993	.9995	.9987	.0863	1.0000	1.0000	1.0000	1.0000	1.0011
.100	.595E+07	1.0029	1.3655	.9990	.9932	.9981	.9951	.1720	1.0000	1.0002	1.0001	1.0001	1.0012
.150	.887E+07	1.0029	1.3653	.9977	.9846	.9957	.9889	.2560	.9999	1.0002	1.0002	1.0001	1.0011
.200	.117E+08	1.0029	1.3651	.9959	.9727	.9923	.9802	.3378	.9999	1.0002	1.0003	1.0000	1.0009
.250	.145E+08	1.0029	1.3648	.9936	.9576	.9881	.9693	.4165	.9998	1.0002	1.0004	.9999	1.0007
.300	.172E+08	1.0028	1.3644	.9908	.9399	.9830	.9563	.4918	.9997	1.0004	1.0007	.9999	1.0007
.350	.197E+08	1.0028	1.3639	.9875	.9194	.9770	.9412	.5628	.9996	1.0006	1.0009	.9999	1.0007
.400	.222E+08	1.0027	1.3634	.9839	.8965	.9701	.9243	.6293	.9995	1.0010	1.0012	1.0001	1.0007
.450	.245E+08	1.0026	1.3627	.9798	.8713	.9626	.9055	.6906	.9994	1.0012	1.0015	1.0000	1.0005
.500	.266E+08	1.0026	1.3620	.9752	.8444	.9542	.8852	.7467	.9993	1.0016	1.0019	1.0001	1.0004
.550	.286E+08	1.0025	1.3613	.9702	.8159	.9452	.8636	.7972	.9992	1.0021	1.0024	1.0002	1.0004
.600	.304E+08	1.0024	1.3604	.9649	.7860	.9356	.8406	.8418	.9990	1.0025	1.0029	1.0002	1.0003
.650	.321E+08	1.0023	1.3595	.9592	.7551	.9253	.8166	.8807	.9989	1.0031	1.0035	1.0002	1.0002
.700	.335E+08	1.0022	1.3584	.9531	.7235	.9146	.7917	.9137	.9988	1.0036	1.0042	1.0001	1.0000
.750	.348E+08	1.0022	1.3573	.9468	.6915	.9033	.7661	.9411	.9986	1.0042	1.0049	1.0001	.9998
.800	.359E+08	1.0021	1.3560	.9402	.6593	.8916	.7401	.9629	.9985	1.0049	1.0057	1.0001	.9997
.850	.369E+08	1.0020	1.3547	.9332	.6272	.8796	.7138	.9795	.9984	1.0060	1.0067	1.0003	.9998
.900	.377E+08	1.0019	1.3533	.9261	.5954	.8672	.6873	.9910	.9983	1.0070	1.0077	1.0004	.9998
.950	.383E+08	1.0018	1.3518	.9187	.5641	.8545	.6608	.9978	.9982	1.0082	1.0088	1.0006	.9999
1.000	.388E+08	1.0017	1.3502	.9112	.5333	.8417	.6344	1.0000	.9981	1.0095	1.0100	1.0008	1.0000
1.050	.391E+08	1.0016	1.3486	.9035	.5032	.8286	.6081	.9980	.9981	1.0108	1.0113	1.0008	1.0000
1.100	.393E+08	1.0015	1.3469	.8956	.4740	.8154	.5822	.9921	.9981	1.0121	1.0127	1.0008	1.0000
1.150	.394E+08	1.0015	1.3451	.8876	.4457	.8021	.5565	.9827	.9981	1.0134	1.0143	1.0007	.9999
1.200	.393E+08	1.0014	1.3432	.8795	.4185	.7888	.5314	.9702	.9982	1.0148	1.0159	1.0005	.9997
1.250	.392E+08	1.0013	1.3413	.8713	.3924	.7754	.5069	.9552	.9983	1.0165	1.0177	1.0005	.9998
1.300	.389E+08	1.0012	1.3394	.8631	.3675	.7620	.4832	.9378	.9984	1.0183	1.0195	1.0005	1.0000
1.350	.386E+08	1.0012	1.3374	.8548	.3436	.7486	.4598	.9179	.9986	1.0197	1.0215	1.0000	.9997
1.400	.381E+08	1.0011	1.3355	.8465	.3210	.7353	.4373	.8965	.9988	1.0214	1.0236	.9997	.9996
1.450	.376E+08	1.0010	1.3336	.8382	.2994	.7221	.4154	.8734	.9990	1.0227	1.0257	.9990	.9991
1.500	.370E+08	1.0009	1.3317	.8299	.2790	.7089	.3943	.8491	.9994	1.0241	1.0280	.9982	.9987
1.550	.364E+08	1.0009	1.3298	.8217	.2597	.6959	.3740	.8240	.9998	1.0255	1.0303	.9975	.9983
1.600	.357E+08	1.0008	1.3280	.8134	.2416	.6830	.3545	.7980	1.0002	1.0268	1.0327	.9964	.9977
1.650	.349E+08	1.0008	1.3263	.8052	.2245	.6702	.3357	.7715	1.0007	1.0279	1.0351	.9952	.9969
1.700	.342E+08	1.0007	1.3246	.7970	.2084	.6576	.3176	.7444	1.0012	1.0285	1.0376	.9935	.9957
1.750	.333E+08	1.0007	1.3231	.7889	.1933	.6451	.3003	.7173	1.0018	1.0291	1.0401	.9917	.9945
1.800	.325E+08	1.0006	1.3218	.7809	.1792	.6327	.2839	.6902	1.0025	1.0295	1.0427	.9897	.9932
1.850	.317E+08	1.0006	1.3206	.7729	.1660	.6205	.2681	.6632	1.0032	1.0295	1.0452	.9874	.9916
1.900	.308E+08	1.0005	1.3195	.7651	.1536	.6084	.2531	.6365	1.0039	1.0294	1.0477	.9849	.9899
1.950	.299E+08	1.0005	1.3187	.7573	.1421	.5965	.2388	.6100	1.0048	1.0288	1.0502	.9821	.9879
2.000	.290E+08	1.0004	1.3180	.7496	.1313	.5848	.2252	.5839	1.0056	1.0277	1.0526	.9788	.9854

TABLE III. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.89665E-04	.46180E-03	.7100
.050	1.3858	.89681E-04	.46167E-03	.6899
.100	1.4008	.89593E-04	.46128E-03	.6900
.150	1.3869	.89448E-04	.46064E-03	.6900
.200	1.3850	.89245E-04	.45975E-03	.6901
.250	1.3846	.88987E-04	.45862E-03	.6902
.300	1.3904	.88673E-04	.45724E-03	.6904
.350	1.3882	.88307E-04	.45564E-03	.6905
.400	1.3901	.87890E-04	.45382E-03	.6907
.450	1.3850	.87424E-04	.45179E-03	.6909
.500	1.3866	.86912E-04	.44957E-03	.6912
.550	1.3860	.86356E-04	.44716E-03	.6914
.600	1.3836	.85759E-04	.44458E-03	.6917
.650	1.3828	.85123E-04	.44190E-03	.6920
.700	1.3803	.84452E-04	.43918E-03	.6922
.750	1.3801	.83747E-04	.43633E-03	.6924
.800	1.3783	.83014E-04	.43337E-03	.6926
.850	1.3794	.82253E-04	.43032E-03	.6929
.900	1.3769	.81469E-04	.42719E-03	.6932
.950	1.3763	.80662E-04	.42398E-03	.6935
1.000	1.3743	.79838E-04	.42072E-03	.6939
1.050	1.3717	.78997E-04	.41741E-03	.6942
1.100	1.3699	.78144E-04	.41406E-03	.6946
1.150	1.3667	.77279E-04	.41068E-03	.6951
1.200	1.3652	.76405E-04	.40729E-03	.6955
1.250	1.3650	.75524E-04	.40382E-03	.6960
1.300	1.3639	.74638E-04	.40003E-03	.6971
1.350	1.3585	.73748E-04	.39625E-03	.6981
1.400	1.3587	.72857E-04	.39248E-03	.6991
1.450	1.3548	.71965E-04	.38873E-03	.6999
1.500	1.3535	.71073E-04	.38500E-03	.7007
1.550	1.3526	.70183E-04	.38131E-03	.7013
1.600	1.3502	.69295E-04	.37764E-03	.7018
1.650	1.3483	.68411E-04	.37402E-03	.7021
1.700	1.3451	.67530E-04	.37043E-03	.7023
1.750	1.3446	.66652E-04	.36688E-03	.7021
1.800	1.3439	.65780E-04	.36337E-03	.7016
1.850	1.3419	.64911E-04	.35841E-03	.7038
1.900	1.3419	.64048E-04	.35303E-03	.7066
1.950	1.3405	.63190E-04	.34771E-03	.7091
2.000	1.3389	.62336E-04	.34246E-03	.7112

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. TT = 40.0 K PT = 8.0 ATM RHOT = .566E-02 G/CM3 SVT = 501.370 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.8680	2.0436	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.640E+08	.8680	2.0437	.9995	.9979	.9991	.9988	.0900	.9997	.9996	.9996	1.0000	1.0433
.100	.128E+09	.8678	2.0437	.9979	.9913	.9965	.9950	.1790	.9989	.9982	.9985	1.0000	1.0424
.150	.191E+09	.8676	2.0437	.9953	.9805	.9921	.9888	.2662	.9976	.9961	.9966	1.0000	1.0410
.200	.252E+09	.8672	2.0437	.9918	.9659	.9861	.9804	.3507	.9957	.9932	.9940	1.0002	1.0392
.250	.313E+09	.8668	2.0436	.9872	.9473	.9785	.9696	.4315	.9934	.9894	.9907	1.0002	1.0368
.300	.371E+09	.8662	2.0435	.9818	.9255	.9697	.9568	.5081	.9906	.9851	.9868	1.0004	1.0341
.350	.428E+09	.8656	2.0435	.9755	.9007	.9588	.9421	.5800	.9874	.9803	.9823	1.0008	1.0312
.400	.483E+09	.8650	2.0433	.9684	.8733	.9469	.9255	.6465	.9838	.9750	.9772	1.0013	1.0280
.450	.535E+09	.8642	2.0430	.9606	.8436	.9339	.9073	.7072	.9799	.9693	.9717	1.0020	1.0245
.500	.585E+09	.8635	2.0427	.9521	.8124	.9198	.8879	.7622	.9756	.9636	.9657	1.0031	1.0212
.550	.632E+09	.8627	2.0422	.9431	.7796	.9047	.8671	.8110	.9712	.9576	.9594	1.0043	1.0177
.600	.676E+09	.8619	2.0417	.9334	.7461	.8888	.8454	.8538	.9665	.9516	.9528	1.0059	1.0144
.650	.718E+09	.8611	2.0412	.9234	.7120	.8723	.8229	.8906	.9616	.9458	.9460	1.0079	1.0114
.700	.757E+09	.8603	2.0405	.9129	.6777	.8551	.7997	.9216	.9566	.9401	.9389	1.0103	1.0085
.750	.793E+09	.8595	2.0397	.9022	.6436	.8375	.7761	.9469	.9515	.9346	.9317	1.0131	1.0060
.800	.826E+09	.8587	2.0403	.8913	.6096	.8195	.7520	.9670	.9467	.9293	.9244	1.0163	1.0039
.850	.857E+09	.8579	2.0409	.8803	.5762	.8011	.7277	.9819	.9418	.9241	.9169	1.0198	1.0022
.900	.886E+09	.8571	2.0417	.8691	.5436	.7826	.7035	.9922	.9368	.9194	.9094	1.0239	1.0010
.950	.912E+09	.8563	2.0424	.8577	.5120	.7640	.6793	.9982	.9319	.9152	.9019	1.0286	1.0003
1.000	.935E+09	.8556	2.0429	.8462	.4814	.7453	.6552	.9999	.9270	.9112	.8943	1.0336	.9999
1.050	.957E+09	.8549	2.0433	.8347	.4521	.7267	.6317	.9982	.9221	.9080	.8869	1.0395	1.0003
1.100	.976E+09	.8543	2.0435	.8231	.4240	.7082	.6084	.9932	.9173	.9053	.8795	1.0459	1.0011
1.150	.993E+09	.8537	2.0433	.8114	.3973	.6898	.5856	.9853	.9124	.9032	.8723	1.0529	1.0025
1.200	.101E+10	.8531	2.0428	.7998	.3719	.6718	.5633	.9748	.9076	.9018	.8652	1.0605	1.0045
1.250	.102E+10	.8525	2.0420	.7881	.3479	.6540	.5416	.9622	.9029	.9012	.8583	1.0690	1.0072
1.300	.103E+10	.8521	2.0409	.7766	.3253	.6365	.5206	.9477	.8983	.9012	.8517	1.0789	1.0105
1.350	.104E+10	.8516	2.0394	.7651	.3039	.6194	.5001	.9314	.8937	.9019	.8452	1.0876	1.0143
1.400	.105E+10	.8512	2.0376	.7537	.2838	.6027	.4802	.9137	.8892	.9032	.8389	1.0979	1.0188
1.450	.106E+10	.8508	2.0357	.7424	.2650	.5864	.4611	.8951	.8849	.9054	.8329	1.1090	1.0240

SATURATION BOUNDARY REACHED.

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.22199E-04	.84287E-04	.8278
.050	1.7849	.22131E-04	.83978E-04	.8283
.100	1.7431	.22077E-04	.83773E-04	.8284
.150	1.7537	.21989E-04	.83431E-04	.8286
.200	1.7614	.21868E-04	.82953E-04	.8289
.250	1.7457	.21712E-04	.82331E-04	.8293
.300	1.7497	.21527E-04	.81566E-04	.8301
.350	1.7521	.21312E-04	.80656E-04	.8314
.400	1.7449	.21069E-04	.79593E-04	.8332
.450	1.7411	.20802E-04	.78785E-04	.8314
.500	1.7444	.20512E-04	.77706E-04	.8317
.550	1.7352	.20200E-04	.76494E-04	.8326
.600	1.7345	.19871E-04	.75157E-04	.8342
.650	1.7327	.19526E-04	.73698E-04	.8367
.700	1.7279	.19167E-04	.72133E-04	.8399
.750	1.7246	.18796E-04	.70618E-04	.8423
.800	1.7201	.18415E-04	.69032E-04	.8452
.850	1.7173	.18025E-04	.67454E-04	.8471
.900	1.7175	.17628E-04	.65976E-04	.8476
.950	1.7159	.17227E-04	.64326E-04	.8500
1.000	1.7094	.16823E-04	.62816E-04	.8505
1.050	1.7123	.16418E-04	.61292E-04	.8512
1.100	1.7071	.16013E-04	.59743E-04	.8524
1.150	1.7051	.15610E-04	.58181E-04	.8541
1.200	1.7013	.15210E-04	.56612E-04	.8563
1.250	1.7007	.14814E-04	.55046E-04	.8591
1.300	1.6970	.14423E-04	.53760E-04	.8577
1.350	1.6914	.14037E-04	.52479E-04	.8575
1.400	1.6871	.13658E-04	.51123E-04	.8590
1.450	1.6864	.13286E-04	.49726E-04	.8621

SATURATION BOUNDARY REACHED.

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. TT = 45.0 K PT = 8.0 ATM RHOT = .481E-02 G/CM3 SVT = 541.451 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9087	1.9185	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.540E+08	.9086	1.9186	.9995	.9979	.9991	.9988	.0897	.9998	.9996	.9996	1.0000	1.0400
.100	.108E+09	.9085	1.9187	.9980	.9913	.9965	.9949	.1785	.9990	.9982	.9985	.9999	1.0391
.150	.161E+09	.9083	1.9188	.9956	.9808	.9922	.9889	.2655	.9978	.9963	.9967	1.0001	1.0380
.200	.213E+09	.9080	1.9189	.9922	.9661	.9862	.9804	.3497	.9962	.9935	.9941	1.0001	1.0364
.250	.264E+09	.9076	1.9190	.9879	.9478	.9787	.9696	.4305	.9941	.9899	.9909	1.0002	1.0343
.300	.313E+09	.9071	1.9191	.9828	.9261	.9696	.9568	.5070	.9916	.9858	.9870	1.0004	1.0319
.350	.361E+09	.9066	1.9193	.9768	.9014	.9591	.9420	.5789	.9887	.9811	.9826	1.0006	1.0293
.400	.407E+09	.9061	1.9193	.9700	.8741	.9473	.9254	.6454	.9854	.9760	.9776	1.0012	1.0263
.450	.451E+09	.9054	1.9193	.9626	.8446	.9343	.9072	.7063	.9819	.9705	.9721	1.0019	1.0233
.500	.493E+09	.9048	1.9192	.9544	.8133	.9202	.8877	.7614	.9780	.9648	.9662	1.0028	1.0202
.550	.532E+09	.9041	1.9190	.9457	.7806	.9051	.8668	.8104	.9738	.9588	.9599	1.0039	1.0170
.600	.569E+09	.9034	1.9188	.9364	.7471	.8892	.8450	.8533	.9695	.9529	.9532	1.0054	1.0139
.650	.604E+09	.9027	1.9184	.9266	.7129	.8726	.8223	.8903	.9650	.9469	.9463	1.0072	1.0110
.700	.636E+09	.9020	1.9180	.9164	.6786	.8554	.7991	.9215	.9603	.9413	.9392	1.0095	1.0084
.750	.666E+09	.9013	1.9174	.9059	.6443	.8377	.7754	.9469	.9555	.9357	.9320	1.0122	1.0060
.800	.694E+09	.9007	1.9168	.8951	.6104	.8196	.7513	.9670	.9507	.9304	.9246	1.0153	1.0040
.850	.719E+09	.9000	1.9161	.8840	.5770	.8013	.7271	.9820	.9458	.9255	.9171	1.0189	1.0023
.900	.743E+09	.8994	1.9153	.8726	.5445	.7828	.7028	.9922	.9408	.9208	.9096	1.0229	1.0010
.950	.764E+09	.8987	1.9144	.8611	.5128	.7641	.6786	.9981	.9359	.9167	.9021	1.0274	1.0002
1.000	.783E+09	.8981	1.9135	.8499	.4823	.7455	.6546	1.0000	.9310	.9130	.8946	1.0326	1.0000
1.050	.800E+09	.8976	1.9133	.8384	.4529	.7268	.6309	.9983	.9263	.9097	.8871	1.0382	1.0003
1.100	.816E+09	.8970	1.9131	.8270	.4247	.7082	.6075	.9933	.9216	.9069	.8796	1.0443	1.0012
1.150	.829E+09	.8965	1.9129	.8155	.3978	.6898	.5844	.9852	.9170	.9044	.8722	1.0509	1.0024
1.200	.841E+09	.8960	1.9127	.8040	.3722	.6715	.5620	.9747	.9125	.9026	.8650	1.0582	1.0043
1.250	.852E+09	.8956	1.9125	.7926	.3480	.6536	.5402	.9619	.9080	.9013	.8578	1.0661	1.0069
1.300	.861E+09	.8952	1.9120	.7812	.3250	.6358	.5188	.9471	.9036	.9006	.8508	1.0744	1.0099
1.350	.869E+09	.8948	1.9115	.7698	.3034	.6185	.4982	.9307	.8993	.9004	.8439	1.0835	1.0135
1.400	.876E+09	.8945	1.9108	.7586	.2832	.6015	.4783	.9130	.8950	.9011	.8372	1.0934	1.0179
1.450	.881E+09	.8942	1.9099	.7475	.2641	.5848	.4590	.8941	.8909	.9023	.8307	1.1037	1.0229
1.500	.886E+09	.8939	1.9089	.7365	.2462	.5686	.4402	.8742	.8868	.9040	.8244	1.1146	1.0282
1.550	.889E+09	.8936	1.9077	.7256	.2296	.5527	.4223	.8538	.8829	.9065	.8183	1.1264	1.0345
1.600	.892E+09	.8935	1.9064	.7149	.2140	.5373	.4050	.8327	.8790	.9094	.8124	1.1385	1.0410
1.650	.894E+09	.8933	1.9051	.7043	.1994	.5223	.3884	.8114	.8753	.9132	.8067	1.1515	1.0485
1.700	.895E+09	.8931	1.9036	.6939	.1859	.5077	.3724	.7897	.8717	.9174	.8012	1.1650	1.0563
1.750	.895E+09	.8930	1.9021	.6837	.1732	.4936	.3571	.7680	.8681	.9223	.7959	1.1791	1.0648
1.800	.895E+09	.8928	1.9007	.6736	.1614	.4799	.3424	.7462	.8647	.9278	.7908	1.1938	1.0738
1.850	.894E+09	.8927	1.8993	.6637	.1505	.4666	.3283	.7246	.8614	.9336	.7860	1.2091	1.0834

SATURATION BOUNDARY REACHED.

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.24137E-04	.91348E-04	.7736
.050	1.7551	.24066E-04	.91029E-04	.7740
.100	1.7157	.24011E-04	.90779E-04	.7742
.150	1.7548	.23920E-04	.90372E-04	.7747
.200	1.7346	.23793E-04	.89399E-04	.7769
.250	1.7373	.23633E-04	.88765E-04	.7790
.300	1.7341	.23440E-04	.87982E-04	.7794
.350	1.7372	.23216E-04	.87050E-04	.7801
.400	1.7321	.22964E-04	.85961E-04	.7812
.450	1.7304	.22684E-04	.84863E-04	.7815
.500	1.7307	.22380E-04	.83602E-04	.7825
.550	1.7242	.22054E-04	.82238E-04	.7837
.600	1.7253	.21708E-04	.80785E-04	.7852
.650	1.7218	.21344E-04	.79250E-04	.7869
.700	1.7231	.20966E-04	.77648E-04	.7889
.750	1.7176	.20574E-04	.76144E-04	.7894
.800	1.7157	.20171E-04	.74592E-04	.7901
.850	1.7133	.19760E-04	.72970E-04	.7913
.900	1.7089	.19342E-04	.71287E-04	.7930
.950	1.7073	.18919E-04	.69553E-04	.7952
1.000	1.7054	.18492E-04	.67870E-04	.7968
1.050	1.7038	.18062E-04	.66178E-04	.7985
1.100	1.7020	.17632E-04	.64538E-04	.7992
1.150	1.6974	.17201E-04	.62958E-04	.7992
1.200	1.6990	.16772E-04	.61359E-04	.7995
1.250	1.6975	.16346E-04	.59750E-04	.8002
1.300	1.6930	.15923E-04	.58166E-04	.8007
1.350	1.6919	.15506E-04	.56596E-04	.8014
1.400	1.6933	.15095E-04	.55030E-04	.8026
1.450	1.6893	.14689E-04	.53471E-04	.8041
1.500	1.6847	.14291E-04	.52043E-04	.8042
1.550	1.6871	.13900E-04	.50628E-04	.8048
1.600	1.6809	.13517E-04	.49180E-04	.8065
1.650	1.6826	.13142E-04	.47715E-04	.8094
1.700	1.6771	.12775E-04	.46237E-04	.8134
1.750	1.6769	.12417E-04	.44758E-04	.8185
1.800	1.6728	.12068E-04	.43430E-04	.8220
1.850	1.6718	.11728E-04	.42179E-04	.8250

SATURATION BOUNDARY REACHED.

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. TT = 50.0 K PT = 8.0 ATM RHOT = .421E-02 G/CM3 SVT = 576.160 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9345	1.8435	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.466E+08	.9344	1.8438	.9995	.9979	.9991	.9988	.0894	.9998	.9996	.9996	1.0000	1.0366
.100	.929E+08	.9343	1.8440	.9981	.9915	.9966	.9951	.1780	.9991	.9985	.9986	1.0001	1.0360
.150	.139E+09	.9341	1.8442	.9953	.9809	.9923	.9889	.2646	.9981	.9964	.9968	1.0000	1.0348
.200	.184E+09	.9339	1.8446	.9927	.9664	.9864	.9803	.3487	.9966	.9937	.9943	1.0001	1.0333
.250	.227E+09	.9335	1.8450	.9886	.9482	.9789	.9696	.4293	.9947	.9903	.9912	1.0002	1.0315
.300	.270E+09	.9332	1.8455	.9837	.9266	.9699	.9567	.5058	.9925	.9863	.9874	1.0003	1.0293
.350	.311E+09	.9327	1.8460	.9780	.9019	.9595	.9418	.5775	.9899	.9817	.9830	1.0005	1.0268
.400	.351E+09	.9322	1.8465	.9715	.8748	.9478	.9253	.6442	.9869	.9768	.9781	1.0011	1.0243
.450	.389E+09	.9317	1.8470	.9643	.8454	.9349	.9070	.7052	.9837	.9715	.9727	1.0017	1.0216
.500	.425E+09	.9311	1.8474	.9565	.8142	.9209	.8874	.7603	.9801	.9658	.9669	1.0025	1.0187
.550	.458E+09	.9305	1.8477	.9480	.7816	.9059	.8665	.8094	.9763	.9600	.9607	1.0036	1.0158
.600	.490E+09	.9299	1.8480	.9391	.7480	.8900	.8446	.8526	.9722	.9541	.9541	1.0050	1.0130
.650	.520E+09	.9292	1.8481	.9295	.7139	.8734	.8219	.8897	.9680	.9482	.9472	1.0067	1.0103
.700	.548E+09	.9286	1.8481	.9196	.6794	.8562	.7985	.9209	.9636	.9424	.9401	1.0088	1.0078
.750	.573E+09	.9280	1.8480	.9093	.6451	.8385	.7748	.9466	.9591	.9369	.9329	1.0114	1.0057
.800	.597E+09	.9274	1.8478	.8987	.6111	.8204	.7506	.9667	.9545	.9315	.9255	1.0143	1.0037
.850	.618E+09	.9267	1.8475	.8878	.5777	.8021	.7262	.9818	.9498	.9265	.9180	1.0177	1.0021
.900	.638E+09	.9262	1.8470	.8767	.5449	.7835	.7018	.9920	.9450	.9217	.9104	1.0215	1.0008
.950	.656E+09	.9256	1.8466	.8654	.5133	.7648	.6777	.9981	.9403	.9176	.9028	1.0261	1.0003
1.000	.672E+09	.9250	1.8459	.8540	.4827	.7461	.6536	1.0000	.9355	.9137	.8953	1.0310	1.0000
1.050	.686E+09	.9245	1.8453	.8425	.4532	.7274	.6298	.9982	.9308	.9103	.8878	1.0365	1.0007
1.100	.699E+09	.9240	1.8445	.8310	.4250	.7088	.6064	.9931	.9261	.9075	.8803	1.0425	1.0010
1.150	.710E+09	.9236	1.8438	.8195	.3981	.6904	.5835	.9851	.9215	.9052	.8730	1.0491	1.0023
1.200	.720E+09	.9232	1.8430	.8079	.3726	.6721	.5611	.9746	.9169	.9034	.8657	1.0564	1.0042
1.250	.728E+09	.9227	1.8425	.7965	.3483	.6541	.5392	.9618	.9125	.9021	.8586	1.0641	1.0067
1.300	.735E+09	.9224	1.8421	.7851	.3253	.6364	.5178	.9469	.9082	.9012	.8515	1.0723	1.0097
1.350	.741E+09	.9220	1.8417	.7739	.3036	.6189	.4971	.9305	.9040	.9010	.8445	1.0812	1.0133
1.400	.746E+09	.9217	1.8412	.7627	.2832	.6018	.4770	.9125	.8998	.9011	.8377	1.0905	1.0173
1.450	.750E+09	.9214	1.8407	.7516	.2640	.5851	.4576	.8934	.8958	.9019	.8311	1.1005	1.0220
1.500	.754E+09	.9212	1.8402	.7406	.2461	.5687	.4389	.8735	.8918	.9033	.8246	1.1112	1.0274
1.550	.756E+09	.9210	1.8396	.7298	.2293	.5528	.4209	.8529	.8879	.9053	.8184	1.1225	1.0334
1.600	.758E+09	.9207	1.8389	.7191	.2136	.5372	.4035	.8318	.8842	.9079	.8122	1.1344	1.0399
1.650	.759E+09	.9206	1.8381	.7085	.1989	.5220	.3868	.8102	.8805	.9110	.8063	1.1469	1.0470
1.700	.759E+09	.9204	1.8372	.6981	.1853	.5073	.3708	.7885	.8770	.9147	.8006	1.1600	1.0547
1.750	.759E+09	.9203	1.8363	.6879	.1726	.4930	.3555	.7667	.8735	.9190	.7950	1.1738	1.0630
1.800	.759E+09	.9202	1.8353	.6778	.1608	.4791	.3408	.7448	.8701	.9238	.7896	1.1881	1.0718
1.850	.758E+09	.9201	1.8343	.6679	.1498	.4657	.3267	.7232	.8669	.9293	.7844	1.2032	1.0813
1.900	.756E+09	.9200	1.8333	.6582	.1396	.4526	.3132	.7017	.8637	.9352	.7794	1.2187	1.0913
1.950	.754E+09	.9200	1.8323	.6486	.1301	.4400	.3002	.6804	.8606	.9415	.7746	1.2347	1.1017
2.000	.752E+09	.9199	1.8313	.6393	.1212	.4277	.2879	.6595	.8577	.9486	.7699	1.2515	1.1129

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

C. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.26049E-04	.98655E-04	.7440
.050	1.7277	.25975E-04	.98342E-04	.7441
.100	1.7349	.25918E-04	.98106E-04	.7442
.150	1.7149	.25824E-04	.97713E-04	.7442
.200	1.7203	.25693E-04	.97168E-04	.7443
.250	1.7222	.25527E-04	.96477E-04	.7445
.300	1.7196	.25327E-04	.95643E-04	.7447
.350	1.7177	.25095E-04	.94674E-04	.7450
.400	1.7249	.24832E-04	.93582E-04	.7454
.450	1.7199	.24542E-04	.92383E-04	.7464
.500	1.7174	.24225E-04	.90890E-04	.7477
.550	1.7174	.23884E-04	.89381E-04	.7492
.600	1.7162	.23522E-04	.87787E-04	.7508
.650	1.7142	.23141E-04	.85654E-04	.7566
.700	1.7130	.22744E-04	.84008E-04	.7577
.750	1.7136	.22333E-04	.82327E-04	.7588
.800	1.7063	.21909E-04	.80593E-04	.7601
.850	1.7075	.21476E-04	.78817E-04	.7616
.900	1.7039	.21034E-04	.77007E-04	.7632
.950	1.7075	.20588E-04	.75186E-04	.7649
1.000	1.7015	.20136E-04	.73437E-04	.7657
1.050	1.6994	.19682E-04	.71673E-04	.7668
1.100	1.6965	.19228E-04	.69898E-04	.7680
1.150	1.6958	.18773E-04	.68121E-04	.7693
1.200	1.6950	.18320E-04	.66347E-04	.7708
1.250	1.6930	.17869E-04	.64580E-04	.7724
1.300	1.6907	.17420E-04	.62908E-04	.7728
1.350	1.6912	.16976E-04	.61300E-04	.7727
1.400	1.6860	.16537E-04	.59684E-04	.7729
1.450	1.6869	.16104E-04	.58067E-04	.7734
1.500	1.6863	.15678E-04	.56459E-04	.7742
1.550	1.6854	.15258E-04	.54861E-04	.7753
1.600	1.6839	.14847E-04	.53281E-04	.7766
1.650	1.6814	.14443E-04	.51725E-04	.7782
1.700	1.6813	.14047E-04	.50250E-04	.7792
1.750	1.6804	.13661E-04	.48760E-04	.7812
1.800	1.6768	.13283E-04	.47368E-04	.7822
1.850	1.6782	.12914E-04	.46029E-04	.7831
1.900	1.6757	.12553E-04	.44718E-04	.7842
1.950	1.6718	.12202E-04	.43437E-04	.7855
2.000	1.6741	.11860E-04	.42186E-04	.7871

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. TT = 60.0 K PT = 8.0 ATM RHOT = .340E-02 G/CM3 SVT = 634.071 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9642	1.7450	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.363E+08	.9642	1.7457	.9996	.9979	.9992	.9987	.0887	.9998	.9996	.9997	1.0000	1.0288
.100	.723E+08	.9641	1.7462	.9984	.9915	.9967	.9949	.1766	.9994	.9985	.9987	.9999	1.0283
.150	.108E+09	.9640	1.7470	.9964	.9813	.9926	.9888	.2628	.9986	.9968	.9971	1.0000	1.0276
.200	.143E+09	.9638	1.7481	.9936	.9671	.9870	.9804	.3464	.9976	.9945	.9948	1.0001	1.0266
.250	.177E+09	.9635	1.7494	.9901	.9493	.9797	.9696	.4268	.9962	.9915	.9920	1.0002	1.0254
.300	.210E+09	.9632	1.7510	.9858	.9279	.9711	.9566	.5030	.9946	.9877	.9885	1.0003	1.0237
.350	.242E+09	.9628	1.7527	.9807	.9036	.9610	.9417	.5748	.9927	.9835	.9845	1.0005	1.0219
.400	.273E+09	.9624	1.7546	.9750	.8768	.9496	.9251	.6415	.9904	.9790	.9800	1.0009	1.0201
.450	.302E+09	.9620	1.7565	.9685	.8475	.9369	.9066	.7026	.9879	.9738	.9749	1.0012	1.0178
.500	.330E+09	.9615	1.7584	.9614	.8165	.9232	.8869	.7581	.9851	.9685	.9694	1.0020	1.0157
.550	.357E+09	.9611	1.7605	.9537	.7839	.9084	.8658	.8075	.9821	.9628	.9634	1.0027	1.0134
.600	.381E+09	.9606	1.7624	.9454	.7504	.8928	.8437	.8510	.9788	.9571	.9571	1.0038	1.0111
.650	.404E+09	.9600	1.7642	.9366	.7162	.8764	.8208	.8885	.9753	.9513	.9504	1.0054	1.0090
.700	.425E+09	.9595	1.7658	.9272	.6815	.8593	.7971	.9199	.9716	.9453	.9435	1.0069	1.0067
.750	.445E+09	.9590	1.7673	.9175	.6471	.8416	.7731	.9459	.9677	.9398	.9363	1.0092	1.0050
.800	.463E+09	.9584	1.7685	.9077	.6138	.8235	.7486	.9662	.9636	.9341	.9290	1.0117	1.0032
.850	.479E+09	.9579	1.7696	.8968	.5792	.8051	.7242	.9816	.9595	.9290	.9215	1.0148	1.0019
.900	.494E+09	.9574	1.7704	.8861	.5463	.7865	.6996	.9920	.9552	.9239	.9139	1.0182	1.0008
.950	.507E+09	.9569	1.7711	.8751	.5143	.7677	.6751	.9979	.9508	.9193	.9063	1.0221	1.0000
1.000	.519E+09	.9564	1.7715	.8639	.4836	.7489	.6510	1.0000	.9464	.9153	.8987	1.0269	1.0000
1.050	.529E+09	.9559	1.7718	.8526	.4538	.7301	.6270	.9981	.9419	.9116	.8911	1.0318	1.0001
1.100	.538E+09	.9555	1.7719	.8412	.4255	.7114	.6035	.9930	.9375	.9084	.8836	1.0375	1.0009
1.150	.546E+09	.9550	1.7718	.8297	.3984	.6929	.5805	.9849	.9330	.9057	.8762	1.0437	1.0021
1.200	.553E+09	.9546	1.7717	.8183	.3727	.6745	.5581	.9744	.9286	.9037	.8688	1.0507	1.0040
1.250	.559E+09	.9543	1.7714	.8069	.3483	.6564	.5361	.9613	.9243	.9021	.8616	1.0580	1.0063
1.300	.564E+09	.9539	1.7711	.7954	.3253	.6386	.5148	.9466	.9200	.9012	.8545	1.0661	1.0093
1.350	.568E+09	.9536	1.7706	.7840	.3035	.6211	.4942	.9300	.9158	.9008	.8475	1.0747	1.0128
1.400	.571E+09	.9533	1.7702	.7727	.2831	.6040	.4741	.9120	.9117	.9009	.8407	1.0839	1.0168
1.450	.573E+09	.9530	1.7697	.7615	.2639	.5872	.4548	.8930	.9076	.9017	.8341	1.0938	1.0216
1.500	.575E+09	.9528	1.7691	.7505	.2459	.5707	.4361	.8729	.9037	.9028	.8276	1.1041	1.0267
1.550	.576E+09	.9525	1.7686	.7395	.2292	.5547	.4182	.8524	.8998	.9048	.8212	1.1153	1.0327
1.600	.576E+09	.9523	1.7682	.7288	.2134	.5390	.4009	.8311	.8961	.9071	.8150	1.1269	1.0391
1.650	.576E+09	.9521	1.7678	.7181	.1987	.5238	.3842	.8094	.8925	.9098	.8090	1.1389	1.0459
1.700	.576E+09	.9520	1.7674	.7077	.1850	.5090	.3682	.7876	.8890	.9132	.8031	1.1516	1.0535
1.750	.575E+09	.9518	1.7670	.6974	.1722	.4945	.3528	.7656	.8855	.9171	.7975	1.1650	1.0616
1.800	.574E+09	.9517	1.7665	.6872	.1604	.4805	.3382	.7438	.8822	.9215	.7919	1.1790	1.0703
1.850	.572E+09	.9516	1.7661	.6772	.1493	.4669	.3241	.7219	.8790	.9264	.7866	1.1935	1.0794
1.900	.570E+09	.9515	1.7656	.6674	.1391	.4538	.3106	.7002	.8758	.9317	.7814	1.2084	1.0890
1.950	.568E+09	.9514	1.7651	.6578	.1295	.4410	.2977	.6790	.8728	.9378	.7763	1.2243	1.0995
2.000	.566E+09	.9514	1.7645	.6483	.1207	.4286	.2854	.6579	.8698	.9442	.7715	1.2404	1.1103

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.29733E-04	.11626E-03	.7013
.050	1.6656	.29653E-04	.11588E-03	.7013
.100	1.6725	.29594E-04	.11559E-03	.7013
.150	1.6946	.29495E-04	.11513E-03	.7013
.200	1.6917	.29359E-04	.11447E-03	.7013
.250	1.6910	.29184E-04	.11364E-03	.7014
.300	1.6821	.28974E-04	.11263E-03	.7016
.350	1.6881	.28728E-04	.11146E-03	.7018
.400	1.6933	.28450E-04	.11013E-03	.7022
.450	1.6867	.28140E-04	.10865E-03	.7027
.500	1.6938	.27802E-04	.10486E-03	.7180
.550	1.6890	.27436E-04	.10325E-03	.7182
.600	1.6932	.27046E-04	.10154E-03	.7186
.650	1.6958	.26634E-04	.99753E-04	.7191
.700	1.6901	.26203E-04	.97911E-04	.7194
.750	1.6982	.25755E-04	.96006E-04	.7200
.800	1.6917	.25292E-04	.94064E-04	.7206
.850	1.6979	.24817E-04	.92094E-04	.7212
.900	1.6919	.24333E-04	.90085E-04	.7220
.950	1.6925	.23841E-04	.87952E-04	.7237
1.000	1.6968	.23344E-04	.85818E-04	.7255
1.050	1.6905	.22842E-04	.83189E-04	.7317
1.100	1.6925	.22339E-04	.81147E-04	.7331
1.150	1.6895	.21836E-04	.79110E-04	.7345
1.200	1.6920	.21333E-04	.77085E-04	.7360
1.250	1.6872	.20833E-04	.75079E-04	.7376
1.300	1.6895	.20336E-04	.73116E-04	.7390
1.350	1.6860	.19843E-04	.71223E-04	.7400
1.400	1.6849	.19355E-04	.69359E-04	.7409
1.450	1.6852	.18874E-04	.67528E-04	.7419
1.500	1.6816	.18398E-04	.65732E-04	.7428
1.550	1.6849	.17930E-04	.63976E-04	.7436
1.600	1.6814	.17469E-04	.62257E-04	.7443
1.650	1.6791	.17016E-04	.60554E-04	.7451
1.700	1.6799	.16571E-04	.58867E-04	.7462
1.750	1.6793	.16135E-04	.57204E-04	.7474
1.800	1.6789	.15708E-04	.55610E-04	.7482
1.850	1.6772	.15290E-04	.54065E-04	.7489
1.900	1.6747	.14881E-04	.52562E-04	.7495
1.950	1.6783	.14481E-04	.51101E-04	.7501
2.000	1.6741	.14091E-04	.49682E-04	.7505

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. TT = 40.0 K PT = 8.0 ATM RHOT = .2486E-02 G/CM3 SVT = 716.788 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	.9890	1.5896	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.244E+08	.9889	1.5910	.9997	.9981	.9993	.9988	.0870	1.0000	.9999	.9998	1.0001	1.0090
.100	.486E+08	.9889	1.5919	.9989	.9922	.9972	.9951	.1733	.9999	.9992	.9992	1.0001	1.0089
.150	.726E+08	.9888	1.5935	.9975	.9825	.9937	.9889	.2580	.9998	.9980	.9982	1.0000	1.0087
.200	.961E+08	.9887	1.5956	.9956	.9691	.9889	.9802	.3403	.9996	.9965	.9968	1.0000	1.0085
.250	.119E+09	.9885	1.5983	.9932	.9522	.9827	.9694	.4196	.9993	.9945	.9950	1.0000	1.0083
.300	.141E+09	.9883	1.6016	.9902	.9320	.9752	.9563	.4953	.9990	.9920	.9927	.9999	1.0079
.350	.163E+09	.9881	1.6054	.9866	.9089	.9664	.9414	.5667	.9986	.9892	.9901	1.0001	1.0076
.400	.184E+09	.9878	1.6097	.9825	.8830	.9563	.9244	.6334	.9981	.9859	.9869	1.0001	1.0072
.450	.203E+09	.9875	1.6146	.9779	.8548	.9451	.9058	.6949	.9975	.9823	.9834	1.0003	1.0067
.500	.222E+09	.9872	1.6198	.9727	.8246	.9328	.8856	.7509	.9968	.9781	.9794	1.0005	1.0061
.550	.239E+09	.9869	1.6255	.9670	.7926	.9193	.8640	.8011	.9959	.9735	.9749	1.0006	1.0054
.600	.256E+09	.9865	1.6314	.9608	.7594	.9049	.8413	.8455	.9948	.9686	.9700	1.0010	1.0047
.650	.271E+09	.9862	1.6377	.9541	.7253	.8896	.8177	.8841	.9936	.9635	.9647	1.0016	1.0040
.700	.285E+09	.9858	1.6440	.9468	.6907	.8734	.7933	.9167	.9921	.9580	.9590	1.0022	1.0032
.750	.298E+09	.9854	1.6505	.9391	.6558	.8565	.7684	.9435	.9905	.9523	.9528	1.0031	1.0024
.800	.309E+09	.9850	1.6569	.9308	.6210	.8390	.7432	.9648	.9886	.9466	.9464	1.0043	1.0017
.850	.320E+09	.9846	1.6632	.9221	.5866	.8209	.7177	.9807	.9865	.9407	.9396	1.0057	1.0010
.900	.329E+09	.9842	1.6693	.9130	.5529	.8025	.6923	.9917	.9841	.9351	.9325	1.0077	1.0005
.950	.338E+09	.9838	1.6750	.9034	.5199	.7837	.6669	.9978	.9816	.9293	.9252	1.0098	1.0000
1.000	.345E+09	.9834	1.6805	.8935	.4882	.7648	.6420	1.0000	.9788	.9241	.9177	1.0126	1.0000
1.050	.351E+09	.9831	1.6854	.8832	.4576	.7457	.6173	.9981	.9758	.9190	.9101	1.0159	1.0001
1.100	.357E+09	.9827	1.6899	.8727	.4283	.7266	.5932	.9927	.9726	.9144	.9025	1.0197	1.0006
1.150	.361E+09	.9823	1.6939	.8619	.4004	.7076	.5695	.9843	.9692	.9103	.8948	1.0242	1.0015
1.200	.365E+09	.9820	1.6975	.8509	.3740	.6888	.5468	.9734	.9657	.9068	.8872	1.0294	1.0030
1.250	.368E+09	.9817	1.7005	.8398	.3489	.6702	.5245	.9600	.9621	.9039	.8796	1.0352	1.0049
1.300	.370E+09	.9813	1.7031	.8286	.3254	.6519	.5030	.9447	.9584	.9016	.8722	1.0417	1.0073
1.350	.372E+09	.9811	1.7052	.8173	.3032	.6338	.4823	.9277	.9547	.8999	.8649	1.0489	1.0103
1.400	.373E+09	.9808	1.7069	.8060	.2824	.6162	.4622	.9092	.9509	.8988	.8577	1.0566	1.0137
1.450	.374E+09	.9805	1.7083	.7947	.2630	.5989	.4430	.8899	.9472	.8985	.8507	1.0653	1.0180
1.500	.374E+09	.9803	1.7094	.7835	.2448	.5820	.4244	.8695	.9434	.8988	.8439	1.0745	1.0227
1.550	.374E+09	.9800	1.7101	.7723	.2279	.5655	.4066	.8485	.9397	.8998	.8373	1.0844	1.0281
1.600	.374E+09	.9798	1.7107	.7612	.2121	.5495	.3895	.8271	.9360	.9014	.8309	1.0950	1.0341
1.650	.373E+09	.9796	1.7111	.7502	.1974	.5339	.3732	.8054	.9324	.9037	.8246	1.1064	1.0408
1.700	.372E+09	.9794	1.7113	.7394	.1837	.5187	.3575	.7835	.9288	.9065	.8186	1.1183	1.0479
1.750	.370E+09	.9793	1.7114	.7287	.1709	.5040	.3425	.7614	.9254	.9099	.8127	1.1308	1.0557
1.800	.369E+09	.9791	1.7114	.7182	.1591	.4897	.3281	.7395	.9220	.9140	.8070	1.1439	1.0641
1.850	.367E+09	.9790	1.7114	.7078	.1481	.4758	.3143	.7176	.9187	.9185	.8015	1.1576	1.0730
1.900	.365E+09	.9788	1.7112	.6976	.1378	.4624	.3012	.6960	.9154	.9236	.7962	1.1720	1.0825
1.950	.363E+09	.9787	1.7111	.6876	.1283	.4493	.2886	.6747	.9123	.9292	.7910	1.1869	1.0925
2.000	.360E+09	.9786	1.7109	.6777	.1196	.4367	.2767	.6538	.9093	.9355	.7860	1.2027	1.1033

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.36540E-04	.15047E-03	.7054
.050	1.6075	.36450E-04	.14986E-03	.7054
.100	1.5771	.36392E-04	.14945E-03	.7054
.150	1.5700	.36295E-04	.14878E-03	.7054
.200	1.5746	.36159E-04	.14785E-03	.7055
.250	1.5823	.35986E-04	.14665E-03	.7057
.300	1.5780	.35774E-04	.14521E-03	.7059
.350	1.5894	.35527E-04	.14374E-03	.7050
.400	1.5891	.35243E-04	.14221E-03	.7035
.450	1.5945	.34925E-04	.14049E-03	.7019
.500	1.5974	.34572E-04	.13859E-03	.7003
.550	1.6006	.34188E-04	.13653E-03	.6987
.600	1.6078	.33773E-04	.13430E-03	.6972
.650	1.6151	.33329E-04	.13194E-03	.6958
.700	1.6189	.32858E-04	.12944E-03	.6946
.750	1.6239	.32363E-04	.12682E-03	.6937
.800	1.6303	.31845E-04	.12410E-03	.6930
.850	1.6348	.31308E-04	.12143E-03	.6919
.900	1.6428	.30755E-04	.11874E-03	.6908
.950	1.6430	.30187E-04	.11599E-03	.6902
1.000	1.6530	.29608E-04	.11321E-03	.6900
1.050	1.6541	.29021E-04	.11039E-03	.6902
1.100	1.6586	.28428E-04	.10755E-03	.6908
1.150	1.6627	.27831E-04	.10472E-03	.6918
1.200	1.6670	.27233E-04	.10092E-03	.7000
1.250	1.6678	.26637E-04	.98333E-04	.7006
1.300	1.6711	.26042E-04	.95787E-04	.7013
1.350	1.6718	.25452E-04	.93295E-04	.7021
1.400	1.6712	.24867E-04	.90855E-04	.7030
1.450	1.6766	.24289E-04	.88471E-04	.7040
1.500	1.6741	.23718E-04	.86101E-04	.7054
1.550	1.6748	.23155E-04	.83756E-04	.7072
1.600	1.6760	.22601E-04	.81162E-04	.7117
1.650	1.6770	.22056E-04	.78981E-04	.7131
1.700	1.6755	.21521E-04	.76860E-04	.7146
1.750	1.6749	.20996E-04	.74795E-04	.7160
1.800	1.6757	.20480E-04	.72801E-04	.7172
1.850	1.6739	.19975E-04	.70868E-04	.7184
1.900	1.6747	.19480E-04	.68996E-04	.7193
1.950	1.6740	.18996E-04	.67181E-04	.7202
2.000	1.6767	.18522E-04	.65422E-04	.7210

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. TT = 100.0 K PT = 8.0 ATM PHOT = .197E-02 G/CM3 SVT = 777.049 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9982	1.4671	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.179E+08	.9982	1.4689	.9998	.9981	.9994	.9987	.0859	1.0000	.9999	.9999	.9999	.5960
.100	.357E+08	.9981	1.4696	.9991	.9927	.9977	.9951	.1711	1.0001	.9997	.9997	1.0000	.9962
.150	.533E+08	.9980	1.4708	.9980	.9837	.9949	.9889	.2548	1.0003	.9993	.9994	1.0000	.9964
.200	.705E+08	.9979	1.4724	.9965	.9713	.9909	.9804	.3363	1.0005	.9987	.9989	1.0001	.9966
.250	.874E+08	.9978	1.4746	.9945	.9554	.9859	.9694	.4148	1.0007	.9978	.9982	1.0000	.9968
.300	.104E+09	.9977	1.4772	.9922	.9363	.9797	.9562	.4899	1.0011	.9967	.9973	.9998	.9969
.350	.119E+09	.9975	1.4804	.9894	.9146	.9725	.9412	.5609	1.0014	.9955	.9963	.9999	.9973
.400	.134E+09	.9973	1.4840	.9862	.8902	.9642	.9241	.6274	1.0018	.9940	.9950	.9998	.9977
.450	.149E+09	.9971	1.4882	.9825	.8636	.9548	.9054	.6890	1.0023	.9923	.9935	.9999	.9982
.500	.162E+09	.9969	1.4930	.9785	.83	.9445	.8849	.7452	1.0027	.9901	.9917	.9997	.9984
.550	.175E+09	.9966	1.4983	.9741	.804	.9332	.8629	.7958	1.0032	.9876	.9896	.9995	.9987
.600	.186E+09	.9964	1.5042	.9694	.7721	.9209	.8399	.8408	1.0037	.9848	.9873	.9993	.9990
.650	.197E+09	.9961	1.5106	.9642	.7391	.9078	.8159	.8801	1.0041	.9818	.9845	.9993	.9995
.700	.207E+09	.9958	1.5176	.9587	.7052	.8938	.7908	.9135	1.0046	.9782	.9814	.9991	.9997
.750	.216E+09	.9955	1.5252	.9528	.6708	.8790	.7652	.9411	1.0050	.9742	.9779	.9988	.9998
.800	.224E+09	.9952	1.5333	.9465	.6361	.8634	.7389	.9630	1.0053	.9696	.9739	.9985	.9999
.850	.231E+09	.9950	1.5419	.9399	.6017	.8471	.7126	.9799	1.0055	.9650	.9695	.9986	1.0001
.900	.237E+09	.9947	1.5509	.9329	.5675	.8302	.6860	.9914	1.0056	.9599	.9647	.9985	1.0002
.950	.243E+09	.9944	1.5604	.9255	.5338	.8127	.6594	.9979	1.0056	.9542	.9594	.9984	1.0000
1.000	.247E+09	.9941	1.5701	.9178	.5010	.7947	.6330	1.0000	1.0054	.9484	.9536	.9986	1.0000
1.050	.251E+09	.9938	1.5800	.9097	.4692	.7763	.6071	.9981	1.0050	.9424	.9475	.9991	1.0001
1.100	.254E+09	.9935	1.5899	.9012	.4385	.7576	.5816	.9923	1.0043	.9363	.9409	.9998	1.0002
1.150	.257E+09	.9932	1.5999	.8924	.4091	.7386	.5566	.9832	1.0035	.9301	.9340	1.0008	1.0004
1.200	.259E+09	.9929	1.6096	.8833	.3812	.7196	.5325	.9714	1.0024	.9243	.9268	1.0025	1.0009
1.250	.260E+09	.9927	1.6190	.8737	.3546	.7006	.5090	.9569	1.0010	.9186	.9194	1.0046	1.0016
1.300	.261E+09	.9924	1.6279	.8639	.3296	.6815	.4864	.9403	.9993	.9132	.9119	1.0073	1.0027
1.350	.262E+09	.9922	1.6363	.8539	.3061	.6627	.4647	.9220	.9974	.9084	.9042	1.0107	1.0041
1.400	.262E+09	.9919	1.6440	.8436	.2841	.6440	.4440	.9024	.9953	.9042	.8965	1.0149	1.0061
1.450	.262E+09	.9917	1.6510	.8331	.2636	.6257	.4241	.8817	.9929	.9006	.8889	1.0198	1.0086
1.500	.261E+09	.9915	1.6573	.8224	.2445	.6078	.4050	.8600	.9903	.8977	.8813	1.0254	1.0115
1.550	.261E+09	.9913	1.6629	.8117	.2269	.5903	.3871	.8381	.9876	.8959	.8739	1.0323	1.0154
1.600	.260E+09	.9911	1.6677	.8008	.2105	.5732	.3698	.8156	.9847	.8946	.8667	1.0396	1.0197
1.650	.258E 09	.9909	1.6718	.7900	.1953	.5566	.3535	.7930	.9818	.8943	.8597	1.0479	1.0248
1.700	.257E+09	.9907	1.6753	.7791	.1813	.5405	.3380	.7705	.9787	.8950	.8529	1.0572	1.0306
1.750	.256E+09	.9906	1.6782	.7683	.1683	.5249	.3232	.7480	.9756	.8963	.8463	1.0672	1.0371
1.800	.254E+09	.9904	1.6806	.7576	.1564	.5097	.3092	.7256	.9725	.8984	.8400	1.0779	1.0441
1.850	.252E+09	.9903	1.6825	.7469	.1453	.4950	.2959	.7037	.9694	.9014	.8339	1.0896	1.0521
1.900	.250E+09	.9901	1.6841	.7364	.1351	.4809	.2831	.6818	.9663	.9050	.8280	1.1018	1.0604
1.950	.248E+09	.9900	1.6853	.7260	.1256	.4671	.2711	.6605	.9632	.9093	.8224	1.1148	1.0695
2.000	.246E+09	.9899	1.6863	.7157	.1169	.4539	.2596	.6397	.9602	.9145	.8170	1.1287	1.0795

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.42737E-04	.19637E-03	.7112
.050	1.4442	.42640E-04	.19539E-03	.7115
.100	1.4800	.42586E-04	.19496E-03	.7114
.150	1.4687	.42496E-04	.19426E-03	.7111
.200	1.4723	.42371E-04	.19329E-03	.7108
.250	1.4680	.42211E-04	.19203E-03	.7103
.300	1.4686	.42015E-04	.19050E-03	.7098
.350	1.4778	.41785E-04	.18871E-03	.7092
.400	1.4791	.41520E-04	.18666E-03	.7085
.450	1.4866	.41222E-04	.18436E-03	.7078
.500	1.4840	.40891E-04	.18181E-03	.7070
.550	1.4896	.40527E-04	.17902E-03	.7062
.600	1.4964	.40131E-04	.17600E-03	.7053
.650	1.5055	.39705E-04	.17277E-03	.7046
.700	1.5078	.39248E-04	.16932E-03	.7039
.750	1.5151	.38761E-04	.16578E-03	.7028
.800	1.5209	.38247E-04	.16212E-03	.7016
.850	1.5331	.37706E-04	.15829E-03	.7007
.900	1.5390	.37140E-04	.15432E-03	.7000
.950	1.5457	.36550E-04	.15021E-03	.6996
1.000	1.5560	.35939E-04	.14600E-03	.6996
1.050	1.5668	.35308E-04	.14175E-03	.6998
1.100	1.5746	.34661E-04	.13822E-03	.6966
1.150	1.5839	.34000E-04	.13465E-03	.6938
1.200	1.5960	.33329E-04	.13104E-03	.6914
1.250	1.6024	.32649E-04	.12743E-03	.6896
1.300	1.6115	.31966E-04	.12382E-03	.6884
1.350	1.6198	.31280E-04	.12026E-03	.6876
1.400	1.6282	.30595E-04	.11692E-03	.6865
1.450	1.6336	.29915E-04	.11360E-03	.6860
1.500	1.6381	.29240E-04	.11034E-03	.6861
1.550	1.6489	.28574E-04	.10715E-03	.6867
1.600	1.6487	.27916E-04	.10402E-03	.6878
1.650	1.6546	.27269E-04	.10098E-03	.6893
1.700	1.6598	.26634E-04	.97667E-04	.6937
1.750	1.6605	.26011E-04	.95002E-04	.6945
1.800	1.6621	.25400E-04	.92428E-04	.6954
1.850	1.6674	.24802E-04	.89938E-04	.6965
1.900	1.6642	.24217E-04	.87531E-04	.6976
1.950	1.6673	.23645E-04	.85183E-04	.6990
2.000	1.6709	.23085E-04	.82885E-04	.7006

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. TT = 200.0 K PT = 9.0 ATM RHOT = .977E-03 G/CM3 SVT =1960.481 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0053	1.3492	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.757E+07	1.0053	1.3489	.9998	.9993	.9996	.9998	.0860	1.0000	1.0001	1.0001	1.0000	.9969
.100	.151E+08	1.0053	1.3488	.9990	.9972	.9983	.9950	.1712	1.0000	1.0002	1.0003	1.0000	.9969
.150	.225E+08	1.0053	1.3486	.9978	.9949	.9961	.9899	.2550	1.0001	1.0005	1.0006	1.0000	.9970
.200	.297E+08	1.0052	1.3483	.9962	.9912	.9931	.9801	.3364	1.0001	1.0007	1.0010	.9999	.9968
.250	.368E+08	1.0051	1.3480	.9940	.9858	.9892	.9695	.4150	1.0002	1.0014	1.0016	1.0000	.9971
.300	.436E+08	1.0050	1.3475	.9914	.9812	.9846	.9563	.4899	1.0003	1.0019	1.0023	.9999	.9971
.350	.500E+08	1.0049	1.3471	.9884	.9212	.9797	.9412	.5609	1.0004	1.0027	1.0031	.9999	.9972
.400	.562E+08	1.0048	1.3466	.9850	.8988	.9730	.9242	.6272	1.0006	1.0035	1.0041	.9999	.9974
.450	.620E+08	1.0046	1.3460	.9811	.8741	.9661	.9054	.6886	1.0008	1.0044	1.0052	.9999	.9976
.500	.674E+08	1.0045	1.3454	.9769	.8475	.9585	.8849	.7446	1.0011	1.0053	1.0064	.9997	.9976
.550	.724E+08	1.0043	1.3448	.9724	.8194	.9503	.8631	.7951	1.0013	1.0065	1.0078	.9997	.9978
.600	.770E+08	1.0042	1.3441	.9674	.7901	.9415	.8402	.8401	1.0017	1.0078	1.0093	.9997	.9982
.650	.812E+08	1.0040	1.3435	.9622	.7598	.9321	.8160	.8792	1.0020	1.0090	1.0109	.9995	.9984
.700	.849E+08	1.0038	1.3429	.9567	.7285	.9222	.7911	.9126	1.0025	1.0105	1.0126	.9994	.9987
.750	.881E+08	1.0036	1.3422	.9509	.6968	.9119	.7654	.9403	1.0030	1.0119	1.0145	.9992	.9990
.800	.910E+08	1.0035	1.3416	.9449	.6649	.9011	.7393	.9626	1.0035	1.0136	1.0164	.9991	.9995
.850	.933E+08	1.0033	1.3411	.9386	.6328	.8899	.7126	.9793	1.0041	1.0149	1.0184	.9986	.9996
.900	.953E+08	1.0031	1.3406	.9322	.6010	.8783	.6858	.9911	1.0048	1.0164	1.0206	.9982	.9998
.950	.969E+08	1.0029	1.3402	.9255	.5694	.8664	.6588	.9977	1.0056	1.0177	1.0228	.9974	.9999
1.000	.980E+08	1.0027	1.3399	.9187	.5384	.8542	.6319	1.0000	1.0064	1.0191	1.0250	.9968	1.0000
1.050	.988E+08	1.0025	1.3397	.9118	.5078	.8418	.6050	.9977	1.0073	1.0200	1.0274	.9956	.9998
1.100	.993E+08	1.0024	1.3397	.9047	.4783	.8291	.5786	.9919	1.0083	1.0212	1.0297	.9947	.9998
1.150	.994E+08	1.0022	1.3399	.8976	.4495	.8162	.5525	.9823	1.0093	1.0220	1.0321	.9934	.9994
1.200	.992E+08	1.0020	1.3402	.8903	.4217	.8031	.5268	.9695	1.0104	1.0226	1.0344	.9918	.9990
1.250	.987E+08	1.0019	1.3408	.8830	.3949	.7899	.5017	.9538	1.0116	1.0229	1.0367	.9900	.9984
1.300	.980E+08	1.0017	1.3415	.8756	.3692	.7765	.4772	.9356	1.0128	1.0230	1.0390	.9881	.9976
1.350	.970E+08	1.0016	1.3425	.8682	.3446	.7631	.4533	.9152	1.0141	1.0227	1.0412	.9859	.9967
1.400	.958E+08	1.0014	1.3438	.8607	.3212	.7495	.4302	.8929	1.0155	1.0221	1.0433	.9835	.9956
1.450	.945E+08	1.0013	1.3454	.8532	.2988	.7358	.4078	.8690	1.0169	1.0209	1.0453	.9806	.9941
1.500	.929E+08	1.0012	1.3473	.8457	.2777	.7221	.3861	.8437	1.0184	1.0193	1.0471	.9776	.9924
1.550	.913E+08	1.0010	1.3496	.8382	.2577	.7083	.3653	.8175	1.0199	1.0173	1.0487	.9743	.9905
1.600	.896E+08	1.0009	1.3522	.8307	.2387	.6945	.3452	.7903	1.0214	1.0145	1.0500	.9704	.9880
1.650	.876E+08	1.0008	1.3553	.8232	.2209	.6806	.3260	.7627	1.0230	1.0113	1.0511	.9664	.9856
1.700	.856E+08	1.0007	1.3589	.8157	.2041	.6666	.3076	.7347	1.0246	1.0075	1.0520	.9621	.9828
1.750	.835E+08	1.0006	1.3629	.8082	.1884	.6527	.2901	.7067	1.0263	1.0032	1.0524	.9577	.9798
1.800	.814E+08	1.0005	1.3674	.8007	.1737	.6387	.2733	.6786	1.0279	.9981	1.0525	.9529	.9764
1.850	.793E+08	1.0004	1.3725	.7932	.1600	.6247	.2573	.6505	1.0296	.9923	1.0522	.9477	.9727
1.900	.772E+08	1.0003	1.3781	.7859	.1471	.6106	.2422	.6229	1.0313	.9859	1.0515	.9423	.9687
1.950	.750E+08	1.0003	1.3844	.7785	.1352	.5966	.2278	.5957	1.0329	.9789	1.0502	.9368	.9646
2.000	.729E+08	1.0002	1.3913	.7711	.1241	.5825	.2142	.5691	1.0346	.9713	1.0485	.9311	.9603

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.68533E-04	.37545E-03	.7032
.050	1.3695	.68394E-04	.37488E-03	.7032
.100	1.3497	.68333E-04	.37463E-03	.7032
.150	1.3591	.68231E-04	.37421E-03	.7032
.200	1.3487	.68089E-04	.37363E-03	.7032
.250	1.3612	.67907E-04	.37289E-03	.7032
.300	1.3511	.67687E-04	.37199E-03	.7032
.350	1.3555	.67430E-04	.37094E-03	.7031
.400	1.3540	.67137E-04	.36974E-03	.7030
.450	1.3522	.66809E-04	.36841E-03	.7029
.500	1.3499	.66448E-04	.36695E-03	.7027
.550	1.3513	.66056E-04	.36536E-03	.7025
.600	1.3524	.65633E-04	.36334E-03	.7027
.650	1.3486	.65182E-04	.36051E-03	.7043
.700	1.3498	.64704E-04	.35753E-03	.7058
.750	1.3477	.64202E-04	.35441E-03	.7073
.800	1.3487	.63677E-04	.35115E-03	.7088
.850	1.3455	.63129E-04	.34777E-03	.7103
.900	1.3459	.62561E-04	.34428E-03	.7116
.950	1.3437	.61975E-04	.34069E-03	.7129
1.000	1.3442	.61372E-04	.33702E-03	.7139
1.050	1.3420	.60753E-04	.33326E-03	.7148
1.100	1.3447	.60118E-04	.32943E-03	.7154
1.150	1.3422	.59471E-04	.32554E-03	.7158
1.200	1.3422	.58810E-04	.32160E-03	.7158
1.250	1.3431	.58138E-04	.31761E-03	.7155
1.300	1.3439	.57455E-04	.31358E-03	.7149
1.350	1.3440	.56762E-04	.30952E-03	.7138
1.400	1.3454	.56059E-04	.30543E-03	.7123
1.450	1.3460	.55347E-04	.30131E-03	.7103
1.500	1.3477	.54627E-04	.29716E-03	.7078
1.550	1.3503	.53898E-04	.29057E-03	.7106
1.600	1.3508	.53161E-04	.28396E-03	.7130
1.650	1.3551	.52415E-04	.27732E-03	.7150
1.700	1.3582	.51662E-04	.27067E-03	.7167
1.750	1.3625	.50902E-04	.26401E-03	.7179
1.800	1.3660	.50134E-04	.25733E-03	.7187
1.850	1.3698	.49358E-04	.25065E-03	.7191
1.900	1.3758	.48574E-04	.24396E-03	.7191
1.950	1.3819	.47782E-04	.23726E-03	.7186
2.000	1.3888	.46983E-04	.23056E-03	.7177

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. TT = 300.0 K PT = 8.0 ATM RHOT = .652E-03 G/CM3 SVT =1315.784 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0047	1.3706	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.477E+07	1.0047	1.3761	.9997	.9987	.9995	.9988	.0864	1.0000	1.0001	1.0000	1.0001	1.0017
.100	.951E+07	1.0047	1.3860	.9990	.9930	.9981	.9949	.1720	1.0000	.9999	1.0001	.9999	1.0015
.150	.142E+08	1.0047	1.3858	.9977	.9844	.9957	.9888	.2561	.9999	1.0000	1.0001	.9999	1.0015
.200	.188E+08	1.0046	1.3856	.9958	.9727	.9923	.9803	.3379	.9998	1.0002	1.0003	1.0001	1.0015
.250	.232E+08	1.0046	1.3853	.9935	.9578	.9881	.9693	.4167	.9997	1.0001	1.0004	.9999	1.0013
.300	.275E+08	1.0045	1.3849	.9907	.9398	.9829	.9563	.4920	.9996	1.0003	1.0006	.9999	1.0012
.350	.316E+08	1.0044	1.3844	.9874	.9193	.9769	.9413	.5631	.9995	1.0005	1.0008	1.0000	1.0011
.400	.355E+08	1.0043	1.3839	.9837	.8963	.9701	.9243	.6295	.9993	1.0008	1.0011	1.0001	1.0010
.450	.391E+08	1.0042	1.3832	.9795	.8712	.9625	.9056	.6909	.9992	1.0010	1.0015	1.0001	1.0009
.500	.426E+08	1.0041	1.3825	.9749	.8441	.9541	.8852	.7469	.9990	1.0013	1.0018	1.0001	1.0007
.550	.457E+08	1.0040	1.3818	.9699	.8155	.9451	.8635	.7973	.9988	1.0017	1.0023	1.0001	1.0006
.600	.486E+08	1.0039	1.3809	.9645	.7857	.9354	.8407	.8421	.9986	1.0022	1.0028	1.0003	1.0006
.650	.513E+08	1.0037	1.3799	.9587	.7547	.9252	.8166	.8808	.9984	1.0026	1.0034	1.0002	1.0003
.700	.536E+08	1.0036	1.3789	.9526	.7273	.9144	.7918	.9140	.9982	1.0032	1.0040	1.0003	1.0002
.750	.557E+08	1.0034	1.3777	.9462	.6912	.9032	.7663	.9412	.9980	1.0038	1.0048	1.0003	1.0000
.800	.575E+08	1.0033	1.3765	.9395	.6591	.8915	.7403	.9632	.9979	1.0046	1.0056	1.0005	1.0000
.850	.590E+08	1.0032	1.3752	.9326	.6270	.8794	.7140	.9797	.9977	1.0055	1.0065	1.0006	.9999
.900	.603E+08	1.0030	1.3737	.9254	.5951	.8670	.6875	.9911	.9975	1.0065	1.0075	1.0007	.9999
.950	.613E+08	1.0029	1.3722	.9180	.5637	.8544	.6610	.9978	.9974	1.0076	1.0086	1.0009	.9999
1.000	.621E+08	1.0027	1.3706	.9104	.5330	.8415	.6346	1.0000	.9973	1.0089	1.0098	1.0011	1.0000
1.050	.626E+08	1.0026	1.3690	.9026	.5030	.8285	.6084	.9980	.9972	1.0102	1.0111	1.0012	1.0001
1.100	.629E+08	1.0025	1.3673	.8947	.4738	.8153	.5825	.9922	.9971	1.0116	1.0126	1.0013	1.0001
1.150	.630E+08	1.0023	1.3654	.8867	.4455	.8020	.5568	.9827	.9971	1.0128	1.0141	1.0012	.9999
1.200	.629E+08	1.0022	1.3636	.8786	.4183	.7886	.5318	.9704	.9971	1.0144	1.0157	1.0012	.9999
1.250	.627E+08	1.0021	1.3617	.8703	.3923	.7752	.5073	.9553	.9971	1.0161	1.0175	1.0013	1.0000
1.300	.623E+08	1.0019	1.3597	.8621	.3674	.7619	.4835	.9380	.9972	1.0179	1.0194	1.0013	1.0002
1.350	.617E+08	1.0019	1.3578	.8539	.3434	.7485	.4602	.9180	.9973	1.0192	1.0213	1.0008	.9998
1.400	.610E+08	1.0017	1.3558	.8455	.3208	.7352	.4377	.8966	.9975	1.0209	1.0234	1.0005	.9997
1.450	.601E+08	1.0016	1.3539	.8371	.2993	.7220	.4158	.8736	.9977	1.0224	1.0256	1.0000	.9994
1.500	.592E+08	1.0015	1.3520	.8288	.2789	.7089	.3947	.8493	.9980	1.0238	1.0278	.9993	.9990
1.550	.582E+08	1.0014	1.3501	.8205	.2597	.6958	.3744	.8242	.9984	1.0253	1.0302	.9986	.9986
1.600	.571E+08	1.0013	1.3483	.8122	.2415	.6829	.3549	.7983	.9988	1.0267	1.0326	.9977	.9981
1.650	.559E+08	1.0012	1.3466	.8040	.2245	.6701	.3361	.7718	.9992	1.0278	1.0350	.9965	.9973
1.700	.547E+08	1.0011	1.3449	.7958	.2084	.6575	.3181	.7449	.9997	1.0287	1.0375	.9950	.9964
1.750	.534E+08	1.0010	1.3434	.7877	.1933	.6450	.3008	.7178	1.0003	1.0293	1.0401	.9933	.9953
1.800	.520E+08	1.0010	1.3421	.7797	.1792	.6327	.2843	.6907	1.0009	1.0297	1.0426	.9913	.9939
1.850	.507E+08	1.0009	1.3408	.7717	.1660	.6205	.2686	.6637	1.0016	1.0298	1.0452	.9891	.9923
1.900	.493E+08	1.0008	1.3398	.7639	.1537	.6084	.2536	.6370	1.0024	1.0297	1.0477	.9867	.9906
1.950	.479E+08	1.0008	1.3389	.7561	.1422	.5965	.2393	.6106	1.0032	1.0292	1.0502	.9840	.9887
2.000	.465E+08	1.0007	1.3383	.7483	.1314	.5848	.2256	.5844	1.0040	1.0281	1.0526	.9807	.9862

TABLE IV. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

H. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.89712E-04	.46209E-03	.7102
.050	1.4197	.89754E-04	.46196E-03	.6905
.100	1.3750	.89666E-04	.46157E-03	.6905
.150	1.3941	.89520E-04	.46093E-03	.6905
.200	1.3977	.89316E-04	.46003E-03	.6906
.250	1.3853	.89056E-04	.45889E-03	.6907
.300	1.3927	.88741E-04	.45751E-03	.6909
.350	1.3922	.88373E-04	.45590E-03	.6910
.400	1.3912	.87954E-04	.45407E-03	.6912
.450	1.3896	.87486E-04	.45204E-03	.6914
.500	1.3870	.86972E-04	.44980E-03	.6916
.550	1.3883	.86413E-04	.44739E-03	.6919
.600	1.3882	.85813E-04	.44480E-03	.6922
.650	1.3830	.85175E-04	.44213E-03	.6924
.700	1.3852	.84502E-04	.43941E-03	.6926
.750	1.3814	.83795E-04	.43656E-03	.6927
.800	1.3825	.83059E-04	.43361E-03	.6930
.850	1.3803	.82296E-04	.43055E-03	.6932
.900	1.3785	.81509E-04	.42742E-03	.6935
.950	1.3776	.80701E-04	.42421E-03	.6938
1.000	1.3760	.79874E-04	.42094E-03	.6941
1.050	1.3738	.79032E-04	.41762E-03	.6945
1.100	1.3717	.78176E-04	.41427E-03	.6949
1.150	1.3677	.77310E-04	.41089E-03	.6953
1.200	1.3679	.76435E-04	.40750E-03	.6957
1.250	1.3663	.75552E-04	.40402E-03	.6962
1.300	1.3649	.74665E-04	.40023E-03	.6973
1.350	1.3593	.73774E-04	.39644E-03	.6983
1.400	1.3596	.72881E-04	.39267E-03	.6992
1.450	1.3564	.71988E-04	.38892E-03	.7001
1.500	1.3546	.71095E-04	.38519E-03	.7008
1.550	1.3534	.70204E-04	.38149E-03	.7014
1.600	1.3517	.69315E-04	.37782E-03	.7019
1.650	1.3488	.68430E-04	.37419E-03	.7022
1.700	1.3473	.67549E-04	.37059E-03	.7023
1.750	1.3455	.66671E-04	.36704E-03	.7022
1.800	1.3437	.65798E-04	.36353E-03	.7017
1.850	1.3430	.64929E-04	.35856E-03	.7038
1.900	1.3423	.64065E-04	.35318E-03	.7066
1.950	1.3416	.63206E-04	.34786E-03	.7091
2.000	1.3392	.62352E-04	.34260E-03	.7113

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. TT = 45.0 K PT = 10.0 ATM RHOT = .6135-02 G/CM3 SVT = 538.761 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.8850	2.0053	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.678E+08	.8849	2.0055	.9995	.9979	.9991	.9988	.0901	.9997	.9996	.9996	1.0001	1.0445
.100	.135E+09	.8847	2.0057	.9979	.9912	.9965	.9950	.1792	.9989	.9982	.9985	1.0000	1.0436
.150	.202E+09	.8844	2.0059	.9953	.9805	.9921	.9889	.2666	.9976	.9960	.9966	1.0001	1.0423
.200	.267E+09	.8840	2.0062	.9917	.9656	.9860	.9804	.3511	.9957	.9929	.9939	1.0001	1.0404
.250	.331E+09	.8834	2.0065	.9872	.9471	.9784	.9697	.4320	.9933	.9892	.9906	1.0003	1.0381
.300	.393E+09	.8829	2.0068	.9817	.9250	.9692	.9568	.5087	.9905	.9846	.9866	1.0004	1.0352
.350	.453E+09	.8821	2.0071	.9754	.9000	.9586	.9420	.5806	.9872	.9796	.9820	1.0006	1.0322
.400	.511E+09	.8813	2.0074	.9682	.8725	.9466	.9256	.6471	.9836	.9742	.9769	1.0014	1.0290
.450	.566E+09	.8804	2.0077	.9603	.8426	.9335	.9073	.7078	.9796	.9682	.9713	1.0020	1.0254
.500	.618E+09	.8795	2.0078	.9517	.8112	.9193	.8879	.7628	.9753	.9622	.9653	1.0031	1.0220
.550	.668E+09	.8785	2.0079	.9426	.7784	.9042	.8672	.8116	.9707	.9560	.9589	1.0044	1.0185
.600	.715E+09	.8775	2.0078	.9328	.7446	.8882	.8454	.8542	.9658	.9497	.9521	1.0059	1.0150
.650	.758E+09	.8765	2.0077	.9227	.7105	.8715	.8231	.8911	.9609	.9438	.9452	1.0081	1.0120
.700	.799E+09	.8756	2.0073	.9121	.6758	.8543	.7999	.9219	.9557	.9377	.9380	1.0105	1.0089
.750	.837E+09	.8746	2.0069	.9011	.6419	.8366	.7764	.9473	.9505	.9322	.9307	1.0135	1.0064
.800	.872E+09	.8736	2.0064	.8900	.6081	.8186	.7525	.9672	.9452	.9269	.9234	1.0170	1.0042
.850	.904E+09	.8726	2.0057	.8785	.5748	.8003	.7284	.9820	.9399	.9219	.9159	1.0207	1.0023
.900	.933E+09	.8717	2.0050	.8669	.5425	.7818	.7044	.9923	.9345	.9175	.9085	1.0253	1.0011
.950	.960E+09	.8708	2.0041	.8552	.5110	.7633	.6804	.9980	.9292	.9135	.9010	1.0303	1.0002
1.000	.984E+09	.8700	2.0032	.8435	.4807	.7447	.6567	.9999	.9240	.9100	.8936	1.0358	.9999
1.050	.101E+10	.8692	2.0035	.8319	.4514	.7261	.6330	.9981	.9190	.9066	.8862	1.0417	1.0001
1.100	.103E+10	.8684	2.0039	.8203	.4234	.7076	.6098	.9932	.9141	.9039	.8788	1.0483	1.0011
1.150	.104E+10	.8676	2.0043	.8086	.3965	.6892	.5868	.9851	.9093	.9015	.8715	1.0551	1.0023
1.200	.106E+10	.8669	2.0048	.7970	.3711	.6711	.5646	.9748	.9046	.9000	.8643	1.0629	1.0045
1.250	.107E+10	.8662	2.0050	.7855	.3470	.6532	.5428	.9621	.8999	.8989	.8573	1.0712	1.0071
1.300	.108E+10	.8656	2.0049	.7740	.3242	.6355	.5215	.9474	.8953	.8983	.8504	1.0800	1.0102
1.350	.109E+10	.8650	2.0047	.7626	.3028	.6183	.5010	.9312	.8908	.8985	.8436	1.0896	1.0141
1.400	.110E+10	.8645	2.0042	.7513	.2827	.6014	.4812	.9136	.8864	.8995	.8371	1.1000	1.0186
1.450	.111E+10	.8640	2.0033	.7401	.2638	.5849	.4619	.8949	.8821	.9011	.8308	1.1109	1.0237
1.500	.112E+10	.8636	2.0022	.7290	.2461	.5688	.4434	.8754	.8779	.9034	.8247	1.1226	1.0296
1.550	.112E+10	.8632	2.0007	.7181	.2296	.5531	.4255	.8550	.8738	.9064	.8189	1.1348	1.0359
1.600	.112E+10	.8628	1.9991	.7073	.2141	.5379	.4083	.8342	.8698	.9101	.8133	1.1478	1.0430
1.650	.113E+10	.8625	1.9973	.6967	.1997	.5231	.3918	.8131	.8659	.9145	.8079	1.1615	1.0507
1.700	.113E+10	.8622	1.9954	.6863	.1863	.5087	.3759	.7917	.8621	.9196	.8027	1.1758	1.0590

SATURATION BOUNDARY REACHED.

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

A. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.24535E-04	.93873E-04	.8048
.050	1.8048	.24461E-04	.93536E-04	.8053
.100	1.7541	.24403E-04	.93271E-04	.8056
.150	1.7747	.24308E-04	.92836E-04	.8062
.200	1.7649	.24176E-04	.92326E-04	.8062
.250	1.7657	.24008E-04	.91652E-04	.8065
.300	1.7581	.23806E-04	.90819E-04	.8070
.350	1.7610	.23573E-04	.89831E-04	.8079
.400	1.7613	.23310E-04	.88714E-04	.8089
.450	1.7518	.23019E-04	.87390E-04	.8109
.500	1.7556	.22704E-04	.86087E-04	.8120
.550	1.7505	.22366E-04	.84624E-04	.8139
.600	1.7443	.22007E-04	.83007E-04	.8165
.650	1.7493	.21633E-04	.81590E-04	.8168
.700	1.7378	.21242E-04	.79912E-04	.8192
.750	1.7408	.20840E-04	.78437E-04	.8191
.800	1.7357	.20427E-04	.76873E-04	.8197
.850	1.7273	.20005E-04	.75179E-04	.8213
.900	1.7293	.19578E-04	.73385E-04	.8241
.950	1.7217	.19146E-04	.71648E-04	.8261
1.000	1.7195	.18711E-04	.69863E-04	.8289
1.050	1.7133	.18272E-04	.68026E-04	.8320
1.100	1.7163	.17833E-04	.66269E-04	.8340
1.150	1.7085	.17393E-04	.64596E-04	.8348
1.200	1.7120	.16957E-04	.62993E-04	.8349
1.250	1.7067	.16524E-04	.61369E-04	.8355
1.300	1.7025	.16095E-04	.59734E-04	.8364
1.350	1.7021	.15671E-04	.58099E-04	.8379
1.400	1.7007	.15255E-04	.56473E-04	.8398
1.450	1.6962	.14845E-04	.54877E-04	.8420
1.500	1.6942	.14442E-04	.53507E-04	.8414
1.550	1.6891	.14046E-04	.52163E-04	.8411
1.600	1.6881	.13663E-04	.50773E-04	.8423
1.650	1.6841	.13286E-04	.49349E-04	.8451
1.700	1.6814	.12918E-04	.47903E-04	.8494

SATURATION BOUNDARY REACHED.

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

P, TT = 50.0 K PT = 10.0 ATM PHOT = .535E-02 G/CM3 SVT = 574.794 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9181	1.9005	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.584E+08	.9180	1.9008	.9995	.9979	.9991	.9988	.0897	.9998	.9996	.9996	1.0000	1.0402
.100	.116E+09	.9179	1.9010	.9980	.9917	.9965	.9949	.1785	.9990	.9982	.9985	.9999	1.0393
.150	.174E+09	.9176	1.9014	.9955	.9807	.9922	.9899	.2655	.9979	.9962	.9967	1.0001	1.0382
.200	.230E+09	.9172	1.9019	.9923	.9660	.9862	.9804	.3498	.9962	.9933	.9941	1.0001	1.0366
.250	.285E+09	.9168	1.9024	.9880	.9475	.9787	.9695	.4305	.9942	.9896	.9909	1.0001	1.0344
.300	.339E+09	.9162	1.9030	.9829	.9258	.9696	.9568	.5072	.9917	.9855	.9870	1.0004	1.0321
.350	.390E+09	.9156	1.9037	.9769	.9010	.9591	.9420	.5790	.9888	.9807	.9826	1.0007	1.0295
.400	.440E+09	.9149	1.9043	.9701	.8735	.9473	.9253	.6455	.9855	.9753	.9776	1.0011	1.0265
.450	.487E+09	.9142	1.9050	.9627	.8440	.9342	.9072	.7066	.9820	.9698	.9721	1.0019	1.0236
.500	.532E+09	.9134	1.9056	.9545	.8125	.9201	.8876	.7616	.9781	.9638	.9661	1.0028	1.0204
.550	.574E+09	.9126	1.9060	.9457	.7797	.9050	.8668	.8105	.9739	.9577	.9598	1.0039	1.0172
.600	.614E+09	.9117	1.9064	.9364	.7461	.8891	.8451	.8536	.9695	.9517	.9531	1.0055	1.0142
.650	.652E+09	.9109	1.9066	.9266	.7118	.8724	.8223	.8904	.9649	.9455	.9462	1.0072	1.0111
.700	.686E+09	.9100	1.9067	.9163	.6774	.8552	.7992	.9216	.9602	.9396	.9390	1.0096	1.0085
.750	.718E+09	.9091	1.9067	.9057	.6430	.8375	.7754	.9470	.9553	.9339	.9317	1.0123	1.0061
.800	.748E+09	.9083	1.9065	.8948	.6091	.8194	.7514	.9670	.9503	.9284	.9242	1.0154	1.0039
.850	.775E+09	.9074	1.9062	.8836	.5758	.8010	.7273	.9820	.9453	.9234	.9167	1.0192	1.0023
.900	.800E+09	.9066	1.9057	.8722	.5433	.7824	.7031	.9923	.9402	.9188	.9092	1.0234	1.0011
.950	.822E+09	.9058	1.9051	.8607	.5116	.7638	.6790	.9981	.9352	.9145	.9016	1.0280	1.0002
1.000	.842E+09	.9050	1.9045	.8491	.4812	.7451	.6551	1.0000	.9301	.9108	.8941	1.0334	1.0000
1.050	.860E+09	.9042	1.9037	.8374	.4519	.7265	.6315	.9982	.9252	.9076	.8866	1.0392	1.0003
1.100	.876E+09	.9036	1.9029	.8257	.4239	.7079	.6083	.9933	.9202	.9050	.8793	1.0457	1.0011
1.150	.891E+09	.9030	1.9019	.8140	.3971	.6896	.5855	.9853	.9154	.9028	.8720	1.0527	1.0025
1.200	.903E+09	.9024	1.9010	.8024	.3717	.6715	.5632	.9749	.9106	.9014	.8648	1.0604	1.0046
1.250	.914E+09	.9018	1.9002	.7909	.3475	.6535	.5413	.9621	.9060	.9001	.8577	1.0683	1.0071
1.300	.923E+09	.9013	1.8994	.7794	.3247	.6358	.5201	.9475	.9016	.8995	.8507	1.0770	1.0103
1.350	.931E+09	.9008	1.8992	.7681	.3031	.6184	.4995	.9311	.8972	.8994	.8439	1.0863	1.0140
1.400	.938E+09	.9003	1.8989	.7569	.2828	.6014	.4794	.9133	.8930	.8998	.8371	1.0961	1.0183
1.450	.943E+09	.8999	1.8995	.7458	.2637	.5847	.4601	.8944	.8888	.9008	.8306	1.1064	1.0231
1.500	.947E+09	.8995	1.8990	.7348	.2458	.5684	.4414	.8745	.8848	.9024	.8242	1.1174	1.0286
1.550	.951E+09	.8992	1.8984	.7239	.2291	.5525	.4234	.8541	.8808	.9047	.8180	1.1292	1.0348
1.600	.953E+09	.8989	1.8977	.7132	.2135	.5370	.4061	.8331	.8770	.9076	.8120	1.1416	1.0416
1.650	.955E+09	.8986	1.8969	.7026	.1990	.5220	.3895	.8118	.8732	.9112	.8062	1.1547	1.0490
1.700	.955E+09	.8984	1.8957	.6922	.1854	.5073	.3735	.7902	.8695	.9157	.8006	1.1683	1.0569
1.750	.955E+09	.8982	1.8945	.6820	.1728	.4931	.3581	.7684	.8660	.9199	.7952	1.1825	1.0654
1.800	.955E+09	.8980	1.8933	.6719	.1610	.4794	.3434	.7467	.8626	.9251	.7900	1.1973	1.0745
1.850	.954E+09	.8978	1.8919	.6620	.1501	.4660	.3293	.7251	.8592	.9310	.7850	1.2128	1.0842
1.900	.952E+09	.8977	1.8906	.6523	.1399	.4530	.3159	.7038	.8560	.9376	.7802	1.2291	1.0946
1.950	.950E+09	.8976	1.8892	.6428	.1305	.4405	.3030	.6827	.8529	.9446	.7755	1.2459	1.1055
2.000	.947E+09	.8974	1.8879	.6335	.1217	.4284	.2906	.6619	.8499	.9522	.7711	1.2632	1.1169

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

B. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.26381E-04	.10091E-03	.7631
.050	1.7650	.26304E-04	.10058E-03	.7632
.100	1.7184	.26245E-04	.10034E-03	.7632
.150	1.7607	.26148E-04	.99933E-04	.7633
.200	1.7462	.26012E-04	.99370E-04	.7634
.250	1.7334	.25840E-04	.98650E-04	.7635
.300	1.7494	.25633E-04	.97789E-04	.7636
.350	1.7428	.25393E-04	.96786E-04	.7641
.400	1.7364	.25121E-04	.95651E-04	.7645
.450	1.7452	.24821E-04	.94311E-04	.7657
.500	1.7365	.24494E-04	.92829E-04	.7672
.550	1.7336	.24144E-04	.91247E-04	.7690
.600	1.7374	.23772E-04	.89583E-04	.7708
.650	1.7272	.23381E-04	.87564E-04	.7752
.700	1.7327	.22973E-04	.85879E-04	.7764
.750	1.7264	.22552E-04	.84136E-04	.7776
.800	1.7240	.22119E-04	.82331E-04	.7792
.850	1.7247	.21677E-04	.80475E-04	.7811
.900	1.7204	.21227E-04	.78578E-04	.7832
.950	1.7147	.20772E-04	.76727E-04	.7848
1.000	1.7151	.20313E-04	.74968E-04	.7854
1.050	1.7113	.19852E-04	.73155E-04	.7867
1.100	1.7097	.19390E-04	.71299E-04	.7885
1.150	1.7054	.18929E-04	.69450E-04	.7904
1.200	1.7055	.18471E-04	.67648E-04	.7920
1.250	1.6992	.18013E-04	.65847E-04	.7937
1.300	1.7010	.17559E-04	.64126E-04	.7944
1.350	1.6980	.17109E-04	.62468E-04	.7945
1.400	1.6958	.16664E-04	.60804E-04	.7950
1.450	1.6928	.16226E-04	.59164E-04	.7954
1.500	1.6918	.15795E-04	.57556E-04	.7959
1.550	1.6912	.15371E-04	.55954E-04	.7968
1.600	1.6908	.14956E-04	.54367E-04	.7980
1.650	1.6876	.14549E-04	.52800E-04	.7996
1.700	1.6846	.14150E-04	.51391E-04	.7995
1.750	1.6821	.13761E-04	.49949E-04	.8006
1.800	1.6801	.13381E-04	.48487E-04	.8028
1.850	1.6792	.13010E-04	.47015E-04	.8060
1.900	1.6787	.12648E-04	.45542E-04	.8104
1.950	1.6759	.12296E-04	.44186E-04	.8136
2.000	1.6732	.11953E-04	.42930E-04	.8161

TABLE V. REAL-GA ISENTROPIC EXPANSIONS OF PARAHYDROGEN

TT = 60.0 K PT = 10.0 ATM RHOT = .428E-02 G/CM3 SVT = 934.108 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/PHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/PHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	.9557	1.7753	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.453E+08	.9556	1.7760	.9996	.9979	.9992	.9987	.0890	.9998	.9996	.9997	1.0000	1.0312
.100	.904E+08	.9555	1.7765	.9987	.9916	.9967	.9951	.1770	.9993	.9986	.9987	1.0001	1.0308
.150	.135E+09	.9553	1.7773	.9967	.9811	.9925	.9888	.2633	.9985	.9966	.9970	1.0000	1.0298
.200	.179E+09	.9550	1.7785	.9934	.9688	.9868	.9804	.3471	.9973	.9942	.9947	1.0001	1.0288
.250	.221E+09	.9547	1.7799	.9887	.9548	.9796	.9696	.4276	.9959	.9910	.9918	1.0002	1.0274
.300	.263E+09	.9543	1.7815	.9852	.9374	.9708	.9567	.5039	.9941	.9871	.9883	1.0003	1.0256
.350	.303E+09	.9538	1.7833	.9800	.9030	.9606	.9418	.5757	.9919	.9828	.9842	1.0006	1.0236
.400	.341E+09	.9533	1.7853	.9741	.8758	.9491	.9251	.6424	.9895	.9779	.9795	1.0008	1.0214
.450	.378E+09	.9527	1.7873	.9674	.8465	.9364	.9068	.7035	.9868	.9727	.9744	1.0014	1.0192
.500	.413E+09	.9521	1.7894	.9601	.8153	.9226	.8870	.7589	.9838	.9671	.9687	1.0021	1.0168
.550	.446E+09	.9514	1.7917	.9522	.7827	.9078	.8660	.8083	.9806	.9613	.9627	1.0030	1.0144
.600	.477E+09	.9507	1.7936	.9437	.7489	.8920	.8439	.8515	.9770	.9552	.9563	1.0040	1.0118
.650	.505E+09	.9500	1.7955	.9346	.7147	.8756	.8211	.8890	.9733	.9494	.9495	1.0057	1.0096
.700	.532E+09	.9493	1.7972	.9251	.6801	.8584	.7976	.9205	.9693	.9434	.9425	1.0076	1.0074
.750	.556E+09	.9486	1.7987	.9151	.6456	.8407	.7736	.9462	.9652	.9376	.9353	1.0099	1.0053
.800	.579E+09	.9479	1.8000	.9047	.6114	.8226	.7493	.9666	.9609	.9320	.9279	1.0126	1.0036
.850	.599E+09	.9472	1.8010	.8940	.5777	.8042	.7248	.9817	.9565	.9266	.9204	1.0157	1.0020
.900	.618E+09	.9465	1.8019	.8831	.5449	.7856	.7004	.9921	.9519	.9216	.9128	1.0194	1.0009
.950	.634E+09	.9458	1.8025	.8719	.5131	.7668	.6761	.9981	.9474	.9171	.9052	1.0237	1.0002
1.000	.649E+09	.9452	1.8029	.8606	.4823	.7480	.6520	1.0000	.9427	.9130	.8976	1.0285	1.0000
1.050	.662E+09	.9446	1.8031	.8491	.4528	.7292	.6282	.9982	.9381	.9094	.8900	1.0337	1.0002
1.100	.674E+09	.9440	1.8032	.8376	.4244	.7106	.6047	.9930	.9335	.9062	.8825	1.0396	1.0009
1.150	.684E+09	.9434	1.8030	.8260	.3975	.6921	.5818	.9850	.9289	.9037	.8751	1.0461	1.0022
1.200	.693E+09	.9429	1.8028	.8144	.3719	.6737	.5595	.9745	.9243	.9019	.8678	1.0534	1.0042
1.250	.700E+09	.9424	1.8024	.8029	.3476	.6557	.5376	.9618	.9198	.9004	.8606	1.0610	1.0065
1.300	.706E+09	.9419	1.8019	.7914	.3247	.6379	.5164	.9469	.9154	.8997	.8535	1.0694	1.0097
1.350	.711E+09	.9415	1.8014	.7799	.3031	.6205	.4958	.9304	.9111	.8994	.8466	1.0783	1.0133
1.400	.715E+09	.9411	1.8008	.7686	.2828	.6034	.4759	.9127	.9068	.8998	.8399	1.0880	1.0176
1.450	.718E+09	.9407	1.8001	.7574	.2636	.5866	.4566	.8936	.9027	.9006	.8333	1.0980	1.0222
1.500	.721E+09	.9403	1.7995	.7463	.2458	.5703	.4380	.8738	.8986	.9022	.8269	1.1089	1.0278
1.550	.722E+09	.9400	1.7988	.7353	.2290	.5543	.4200	.8532	.8947	.9043	.8206	1.1202	1.0338
1.600	.723E+09	.9397	1.7984	.7246	.2133	.5387	.4027	.8320	.8909	.9066	.8145	1.1320	1.0402
1.650	.723E+09	.9395	1.7979	.7139	.1987	.5235	.3860	.8104	.8873	.9096	.8085	1.1444	1.0473
1.700	.722E+09	.9393	1.7975	.7035	.1850	.5087	.3701	.7887	.8837	.9132	.8027	1.1576	1.0550
1.750	.721E+09	.9390	1.7970	.6932	.1723	.4943	.3547	.7669	.8802	.9173	.7970	1.1712	1.0633
1.800	.720E+09	.9389	1.7965	.6830	.1604	.4803	.3400	.7450	.8768	.9218	.7915	1.1854	1.0720
1.850	.718E+09	.9387	1.7960	.6731	.1494	.4667	.3259	.7233	.8736	.9269	.7862	1.2002	1.0814
1.900	.716E+09	.9386	1.7954	.6633	.1392	.4536	.3124	.7018	.8704	.9327	.7811	1.2158	1.0914
1.950	.713E+09	.9385	1.7948	.6537	.1297	.4408	.2995	.6805	.8673	.9388	.7761	1.2318	1.1019
2.000	.711E+09	.9384	1.7942	.6443	.1208	.4285	.2872	.6595	.8644	.9455	.7713	1.2484	1.1129

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF [illegible]

C. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.29990E-04	.11858E-03	.7077
.050	1.6896	.29908E-04	.11819E-03	.7077
.100	1.7151	.29847E-04	.11790E-03	.7077
.150	1.6881	.29746E-04	.11741E-03	.7076
.200	1.7086	.29606E-04	.11674E-03	.7076
.250	1.7055	.29427E-04	.11589E-03	.7077
.300	1.6982	.29210E-04	.11486E-03	.7078
.350	1.7046	.28959E-04	.11365E-03	.7080
.400	1.7017	.28673E-04	.11229E-03	.7083
.450	1.7067	.28357E-04	.11077E-03	.7088
.500	1.7035	.28010E-04	.10641E-03	.7276
.550	1.7049	.27637E-04	.10476E-03	.7279
.600	1.7015	.27239E-04	.10300E-03	.7283
.650	1.7105	.26819E-04	.10117E-03	.7287
.700	1.7066	.26380E-04	.99292E-04	.7291
.750	1.7053	.25923E-04	.97345E-04	.7296
.800	1.7070	.25453E-04	.95369E-04	.7302
.850	1.7027	.24971E-04	.93362E-04	.7307
.900	1.7053	.24479E-04	.91311E-04	.7315
.950	1.7049	.23980E-04	.89121E-04	.7334
1.000	1.7026	.23477E-04	.86929E-04	.7354
1.050	1.7003	.22969E-04	.84226E-04	.7420
1.100	1.6988	.22460E-04	.82143E-04	.7434
1.150	1.6994	.21951E-04	.80068E-04	.7449
1.200	1.6992	.21444E-04	.78018E-04	.7463
1.250	1.6938	.20939E-04	.75983E-04	.7479
1.300	1.6962	.20437E-04	.73977E-04	.7495
1.350	1.6924	.19940E-04	.72041E-04	.7506
1.400	1.6929	.19449E-04	.70122E-04	.7519
1.450	1.6869	.18963E-04	.68246E-04	.7531
1.500	1.6905	.18484E-04	.66428E-04	.7541
1.550	1.6871	.18013E-04	.64649E-04	.7550
1.600	1.6841	.17548E-04	.62904E-04	.7557
1.650	1.6846	.17092E-04	.61218E-04	.7560
1.700	1.6847	.16644E-04	.59547E-04	.7566
1.750	1.6834	.16205E-04	.57892E-04	.7575
1.800	1.6801	.15774E-04	.56257E-04	.7586
1.850	1.6809	.15354E-04	.54649E-04	.7598
1.900	1.6811	.14943E-04	.53070E-04	.7613
1.950	1.6782	.14541E-04	.51573E-04	.7622
2.000	1.6776	.14149E-04	.50150E-04	.7626

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

TT = 80.0 K PT = 10.0 ATM RHOT = .311E-02 G/CM3 SVT = 717.913 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	.9865	1.6017	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.305E+08	.9865	1.6031	.9997	.9951	.9997	.9998	.0872	1.0000	.9998	1.0000	1.0000	1.0003
.100	.607E+08	.9864	1.6041	.9989	.9902	.9972	.9951	.1735	.9999	.9992	.9992	1.0001	1.0013
.150	.906E+08	.9863	1.6056	.9975	.9824	.9937	.9889	.2583	.9997	.9980	.9982	1.0001	1.0031
.200	.120E+09	.9861	1.6078	.9955	.9690	.9888	.9803	.3407	.9995	.9964	.9967	1.0000	1.0058
.250	.149E+09	.9859	1.6105	.9930	.9520	.9826	.9695	.4202	.9991	.9943	.9949	1.0000	1.0095
.300	.177E+09	.9856	1.6139	.9899	.9317	.9750	.9564	.4959	.9987	.9917	.9926	1.0000	1.0091
.350	.205E+09	.9853	1.6177	.9862	.9084	.9662	.9414	.5673	.9982	.9887	.9898	1.0001	1.0086
.400	.229E+09	.9850	1.6222	.9820	.8825	.9561	.9244	.6340	.9976	.9853	.9867	1.0002	1.0081
.450	.254E+09	.9846	1.6271	.9773	.8541	.9448	.9058	.6955	.9969	.9815	.9830	1.0003	1.0075
.500	.277E+09	.9842	1.6324	.9720	.8239	.9323	.8857	.7515	.9960	.9773	.9790	1.0006	1.0069
.550	.299E+09	.9838	1.6381	.9662	.7918	.9189	.8642	.8017	.9950	.9726	.9744	1.0008	1.0061
.600	.319E+09	.9833	1.6442	.9598	.7586	.9044	.8416	.8462	.9938	.9677	.9695	1.0013	1.0054
.650	.338E+09	.9829	1.6505	.9529	.7245	.8890	.8180	.8846	.9924	.9623	.9641	1.0019	1.0046
.700	.356E+09	.9824	1.6569	.9455	.6897	.8728	.7936	.9171	.9908	.9567	.9583	1.0026	1.0036
.750	.372E+09	.9819	1.6634	.9376	.6548	.8558	.7687	.9438	.9890	.9509	.9521	1.0035	1.0027
.800	.387E+09	.9814	1.6699	.9293	.6200	.8383	.7435	.9650	.9869	.9451	.9455	1.0048	1.0019
.850	.400E+09	.9808	1.6762	.9204	.5856	.8202	.7182	.9809	.9847	.9393	.9387	1.0064	1.0012
.900	.411E+09	.9803	1.6823	.9111	.5519	.8017	.6927	.9917	.9822	.9333	.9316	1.0082	1.0005
.950	.422E+09	.9798	1.6881	.9015	.5190	.7829	.6675	.9980	.9794	.9270	.9243	1.0106	1.0001
1.000	.431E+09	.9793	1.6936	.8914	.4873	.7640	.6425	1.0000	.9765	.9224	.9168	1.0136	1.0000
1.050	.439E+09	.9788	1.6985	.8811	.4568	.7449	.6180	.9981	.9734	.9174	.9092	1.0170	1.0001
1.100	.446E+09	.9784	1.7030	.8704	.4276	.7259	.5939	.9928	.9700	.9129	.9015	1.0210	1.0007
1.150	.452E+09	.9779	1.7070	.8595	.3997	.7069	.5704	.9844	.9666	.9088	.8939	1.0257	1.0016
1.200	.456E+09	.9775	1.7105	.8485	.3734	.6881	.5476	.9735	.9630	.9054	.8863	1.0311	1.0031
1.250	.460E+09	.9770	1.7135	.8373	.3485	.6695	.5255	.9603	.9593	.9026	.8787	1.0372	1.0052
1.300	.463E+09	.9766	1.7161	.8260	.3249	.6512	.5040	.9450	.9555	.9003	.8713	1.0438	1.0076
1.350	.466E+09	.9763	1.7181	.8147	.3029	.6332	.4833	.9281	.9517	.8988	.8640	1.0512	1.0107
1.400	.467E+09	.9759	1.7198	.8033	.2822	.6156	.4634	.9099	.9478	.8980	.8569	1.0593	1.0144
1.450	.468E+09	.9756	1.7211	.7920	.2628	.5983	.4441	.8904	.9440	.8976	.8499	1.0680	1.0185
1.500	.468E+09	.9752	1.7221	.7807	.2446	.5815	.4256	.8701	.9401	.8981	.8432	1.0774	1.0234
1.550	.468E+09	.9749	1.7229	.7695	.2277	.5651	.4079	.8493	.9363	.8993	.8366	1.0877	1.0290
1.600	.468E+09	.9747	1.7234	.7584	.2120	.5491	.3908	.8279	.9326	.9010	.8302	1.0985	1.0351
1.650	.467E+09	.9744	1.7237	.7475	.1973	.5335	.3744	.8062	.9289	.9033	.8240	1.1100	1.0417
1.700	.465E+09	.9742	1.7238	.7366	.1836	.5183	.3587	.7843	.9253	.9063	.8180	1.1221	1.0490
1.750	.464E+09	.9739	1.7238	.7259	.1709	.5036	.3437	.7624	.9218	.9100	.8121	1.1350	1.0571
1.800	.462E+09	.9737	1.7238	.7154	.1591	.4894	.3294	.7405	.9184	.9142	.8065	1.1484	1.0656
1.850	.460E+09	.9736	1.7236	.7050	.1481	.4755	.3156	.7188	.9151	.9189	.8010	1.1624	1.0747
1.900	.457E+09	.9734	1.7234	.6949	.1379	.4621	.3025	.6972	.9118	.9242	.7957	1.1770	1.0843
1.950	.455E+09	.9732	1.7232	.6848	.1285	.4491	.2899	.6760	.9087	.9300	.7906	1.1923	1.0946
2.000	.452E+09	.9731	1.7229	.6750	.1196	.4365	.2779	.6549	.9056	.9361	.7857	1.2079	1.1052

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

D. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.36723E-04	.15188E-03	.7085
.050	1.5974	.36633E-04	.15126E-03	.7085
.100	1.5910	.36573E-04	.15085E-03	.7085
.150	1.5833	.36474E-04	.15016E-03	.7086
.200	1.5850	.36336E-04	.14921E-03	.7087
.250	1.5878	.36159E-04	.14799E-03	.7088
.300	1.5887	.35944E-04	.14651E-03	.7090
.350	1.5949	.35692E-04	.14504E-03	.7081
.400	1.5976	.35403E-04	.14348E-03	.7066
.450	1.6022	.35079E-04	.14174E-03	.7049
.500	1.6089	.34721E-04	.13982E-03	.7033
.550	1.6095	.34331E-04	.13772E-03	.7016
.600	1.6179	.33910E-04	.13547E-03	.7000
.650	1.6211	.33459E-04	.13307E-03	.6986
.700	1.6248	.32982E-04	.13054E-03	.6974
.750	1.6303	.32481E-04	.12788E-03	.6964
.800	1.6381	.31957E-04	.12513E-03	.6957
.850	1.6428	.31414E-04	.12245E-03	.6945
.900	1.6453	.30855E-04	.11975E-03	.6933
.950	1.6528	.30282E-04	.11699E-03	.6925
1.000	1.6578	.29698E-04	.11418E-03	.6922
1.050	1.6601	.29105E-04	.11134E-03	.6923
1.100	1.6657	.28508E-04	.10849E-03	.6929
1.150	1.6677	.27907E-04	.10563E-03	.6939
1.200	1.6720	.27305E-04	.10156E-03	.7036
1.250	1.6752	.26705E-04	.98953E-04	.7042
1.300	1.6737	.26107E-04	.96389E-04	.7049
1.350	1.6777	.25514E-04	.93878E-04	.7057
1.400	1.6781	.24926E-04	.91425E-04	.7066
1.450	1.6761	.24345E-04	.89025E-04	.7075
1.500	1.6788	.23772E-04	.86632E-04	.7090
1.550	1.6805	.23207E-04	.84260E-04	.7108
1.600	1.6788	.22651E-04	.81585E-04	.7158
1.650	1.6782	.22104E-04	.79390E-04	.7173
1.700	1.6786	.21567E-04	.77254E-04	.7187
1.750	1.6802	.21040E-04	.75176E-04	.7201
1.800	1.6785	.20523E-04	.73157E-04	.7215
1.850	1.6776	.20016E-04	.71200E-04	.7227
1.900	1.6767	.19520E-04	.69306E-04	.7238
1.950	1.6770	.19034E-04	.67479E-04	.7247
2.000	1.6739	.18559E-04	.65717E-04	.7255

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

TT = 100.0 K PT = 10.0 ATM RHOT = .246E-02 G/CM3 SVT = 778.515 M/SEC

MACH	PE/M	γ	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									RELATIVE TO IDEAL GAS VALUES				
0.000	0.	.9979	1.4728	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.224E+08	.9979	1.4748	.9998	.9992	.9994	.9988	.0860	1.0000	1.0000	.9999	1.0001	.9970
.100	.446E+08	.9979	1.4755	.9991	.9978	.9977	.9951	.1713	1.0001	.9997	.9997	1.0001	.9971
.150	.666E+08	.9977	1.4767	.9980	.9956	.9949	.9888	.2550	1.0002	.9992	.9993	1.0000	.9971
.200	.881E+08	.9976	1.4783	.9964	.9911	.9909	.9803	.3365	1.0004	.9986	.9988	1.0001	.9974
.250	.109E+09	.9974	1.4805	.9944	.9853	.9869	.9695	.4152	1.0006	.9977	.9981	1.0001	.9976
.300	.129E+09	.9972	1.4832	.9920	.9782	.9826	.9563	.4902	1.0008	.9965	.9972	.9999	.9976
.350	.149E+09	.9970	1.4863	.9891	.9693	.9723	.9411	.5613	1.0011	.9951	.9961	.9998	.9979
.400	.168E+09	.9968	1.4900	.9858	.9589	.9640	.9242	.6278	1.0015	.9936	.9948	.9999	.9982
.450	.185E+09	.9965	1.4943	.9821	.9471	.9546	.9054	.6893	1.0018	.9918	.9933	.9999	.9986
.500	.202E+09	.9962	1.4991	.9780	.9342	.9442	.8850	.7455	1.0022	.9896	.9914	.9998	.9989
.550	.218E+09	.9959	1.5044	.9735	.9203	.9329	.8631	.7961	1.0026	.9870	.9893	.9996	.9991
.600	.233E+09	.9956	1.5103	.9687	.9055	.9206	.8400	.8411	1.0029	.9841	.9869	.9995	.9994
.650	.246E+09	.9952	1.5168	.9636	.8899	.9076	.8159	.8801	1.0033	.9807	.9841	.9993	.9995
.700	.258E+09	.9949	1.5239	.9579	.8736	.8937	.7911	.9137	1.0036	.9773	.9809	.9993	.9999
.750	.269E+09	.9945	1.5315	.9518	.8570	.8795	.7658	.9411	1.0039	.9730	.9773	.9990	.9998
.800	.280E+09	.9941	1.5396	.9454	.8399	.8649	.7392	.9631	1.0041	.9686	.9733	.9989	.9999
.850	.288E+09	.9938	1.5482	.9387	.8210	.8465	.7128	.9798	1.0042	.9638	.9689	.9989	1.0001
.900	.296E+09	.9934	1.5573	.9318	.8058	.8296	.6863	.9913	1.0042	.9586	.9640	.9989	1.0001
.950	.303E+09	.9930	1.5668	.9247	.7892	.8121	.6598	.9979	1.0041	.9531	.9586	.9991	1.0001
1.000	.309E+09	.9926	1.5765	.9163	.7704	.7941	.6335	1.0000	1.0038	.9472	.9529	.9993	1.0000
1.050	.314E+09	.9923	1.5865	.9091	.7547	.7786	.6077	.9981	1.0032	.9413	.9467	1.0000	1.0002
1.100	.318E+09	.9919	1.5965	.8996	.7380	.7569	.5822	.9924	1.0025	.9352	.9401	1.0008	1.0002
1.150	.321E+09	.9915	1.6064	.8907	.7208	.7380	.5572	.9832	1.0016	.9290	.9332	1.0019	1.0004
1.200	.324E+09	.9912	1.6162	.8814	.7037	.7189	.5331	.9714	1.0003	.9232	.9260	1.0037	1.0009
1.250	.326E+09	.9908	1.6256	.8719	.6862	.6990	.5097	.9570	.9989	.9176	.9186	1.0060	1.0018
1.300	.327E+09	.9905	1.6345	.8620	.6682	.6789	.4872	.9405	.9971	.9123	.9110	1.0088	1.0028
1.350	.328E+09	.9902	1.6429	.8519	.6498	.6588	.4655	.9222	.9951	.9075	.9034	1.0124	1.0044
1.400	.328E+09	.9899	1.6506	.8416	.6313	.6385	.4447	.9025	.9929	.9033	.8957	1.0166	1.0062
1.450	.328E+09	.9896	1.6575	.8310	.6126	.6182	.4249	.8820	.9905	.8999	.8881	1.0218	1.0090
1.500	.327E+09	.9893	1.6634	.8204	.5944	.6073	.4059	.8605	.9878	.8972	.8806	1.0277	1.0121
1.550	.326E+09	.9891	1.6687	.8096	.5767	.5899	.3878	.8384	.9851	.8952	.8732	1.0344	1.0158
1.600	.325E+09	.9888	1.6741	.7987	.5594	.5722	.3707	.8162	.9821	.8944	.8660	1.0422	1.0204
1.650	.323E+09	.9886	1.6782	.7878	.5423	.5562	.3544	.7937	.9791	.8942	.8590	1.0507	1.0256
1.700	.322E+09	.9884	1.6817	.7770	.5256	.5401	.3389	.7711	.9760	.8948	.8522	1.0600	1.0314
1.750	.320E+09	.9882	1.6845	.7662	.5093	.5245	.3241	.7486	.9729	.8962	.8457	1.0702	1.0380
1.800	.318E+09	.9880	1.6869	.7554	.4934	.5094	.3101	.7264	.9698	.8985	.8394	1.0811	1.0452
1.850	.316E+09	.9878	1.6888	.7448	.4779	.4947	.2967	.7043	.9666	.9015	.8334	1.0928	1.0531
1.900	.313E+09	.9876	1.6903	.7342	.4631	.4806	.2841	.6827	.9635	.9054	.8275	1.1054	1.0618
1.950	.311E+09	.9875	1.6915	.7239	.4487	.4669	.2720	.6614	.9604	.9098	.8219	1.1186	1.0710
2.000	.308E+09	.9873	1.6924	.7136	.4349	.4536	.2605	.6405	.9574	.9149	.8165	1.1325	1.0809

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

E. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.42882E-04	.19757E-03	.7126
.050	1.5067	.42784E-04	.19652E-03	.7130
.100	1.4764	.42730E-04	.19610E-03	.7128
.150	1.4666	.42638E-04	.19538E-03	.7126
.200	1.4778	.42511E-04	.19439E-03	.7123
.250	1.4787	.42348E-04	.19311E-03	.7118
.300	1.4730	.42150E-04	.19157E-03	.7113
.350	1.4813	.41916E-04	.18975E-03	.7107
.400	1.4867	.41648E-04	.18767E-03	.7100
.450	1.4901	.41345E-04	.18533E-03	.7092
.500	1.4917	.41009E-04	.18275E-03	.7084
.550	1.4958	.40641E-04	.17992E-03	.7076
.600	1.5020	.40240E-04	.17686E-03	.7068
.650	1.5059	.39808E-04	.17358E-03	.7060
.700	1.5170	.39346E-04	.17009E-03	.7053
.750	1.5170	.38854E-04	.16652E-03	.7043
.800	1.5283	.38335E-04	.16283E-03	.7031
.850	1.5365	.37789E-04	.15896E-03	.7021
.900	1.5436	.37217E-04	.15495E-03	.7014
.950	1.5519	.36622E-04	.15081E-03	.7011
1.000	1.5603	.36006E-04	.14656E-03	.7011
1.050	1.5717	.35371E-04	.14231E-03	.7012
1.100	1.5787	.34720E-04	.13877E-03	.6979
1.150	1.5872	.34055E-04	.13518E-03	.6950
1.200	1.5988	.33380E-04	.13155E-03	.6927
1.250	1.6078	.32697E-04	.12792E-03	.6909
1.300	1.6143	.32010E-04	.12430E-03	.6896
1.350	1.6235	.31322E-04	.12075E-03	.6887
1.400	1.6287	.30635E-04	.11739E-03	.6876
1.450	1.6395	.29953E-04	.11407E-03	.6870
1.500	1.6425	.29276E-04	.11080E-03	.6871
1.550	1.6470	.28607E-04	.10760E-03	.6876
1.600	1.6562	.27948E-04	.10447E-03	.6887
1.650	1.6574	.27300E-04	.10141E-03	.6902
1.700	1.6597	.26663E-04	.97967E-04	.6954
1.750	1.6633	.26039E-04	.95294E-04	.6962
1.800	1.6652	.25427E-04	.92714E-04	.6971
1.850	1.6665	.24828E-04	.90217E-04	.6981
1.900	1.6701	.24242E-04	.87804E-04	.6992
1.950	1.6693	.23669E-04	.85447E-04	.7006
2.000	1.6697	.23109E-04	.83136E-04	.7022

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. TT = 200.0 K PT = 10.0 ATM RHOT = .122E-02 G/CM3 SVT =1062.277 M/SEC

MACH	PE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0067	1.3501	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.945E+07	1.0067	1.3498	.9998	.9982	.9996	.9987	.0860	1.0000	1.0000	1.0001	.9999	.9973
.100	.188E+08	1.0066	1.3497	.9990	.9932	.9983	.9950	.1713	1.0000	1.0001	1.0003	.9999	.9973
.150	.281E+08	1.0066	1.3495	.9978	.9848	.9961	.9887	.2550	1.0000	1.0004	1.0006	.9999	.9973
.200	.371E+08	1.0065	1.3492	.9961	.9733	.9931	.9802	.3365	1.0001	1.0008	1.0010	1.0000	.9974
.250	.459E+08	1.0064	1.3488	.9939	.9586	.9892	.9693	.4151	1.0001	1.0012	1.0016	.9999	.9974
.300	.544E+08	1.0063	1.3484	.9913	.9412	.9846	.9564	.4902	1.0002	1.0019	1.0023	1.0000	.9976
.350	.625E+08	1.0061	1.3479	.9883	.9211	.9791	.9413	.5611	1.0003	1.0025	1.0031	1.0000	.9976
.400	.702E+08	1.0060	1.3474	.9848	.8985	.9729	.9241	.6274	1.0004	1.0032	1.0041	.9998	.9976
.450	.775E+08	1.0058	1.3468	.9809	.8739	.9660	.9054	.6888	1.0006	1.0041	1.0051	.9999	.9978
.500	.842E+08	1.0056	1.3462	.9767	.8473	.9584	.8850	.7448	1.0008	1.0051	1.0064	.9998	.9979
.550	.905E+08	1.0054	1.3456	.9720	.8192	.9502	.8632	.7953	1.0010	1.0062	1.0077	.9997	.9981
.600	.962E+08	1.0052	1.3449	.9671	.7899	.9414	.8403	.8403	1.0013	1.0075	1.0092	.9998	.9984
.650	.101E+09	1.0050	1.3442	.9618	.7594	.9320	.8162	.8794	1.0016	1.0088	1.0108	.9997	.9986
.700	.106E+09	1.0048	1.3436	.9562	.7282	.9221	.7912	.9127	1.0020	1.0101	1.0125	.9995	.9988
.750	.110E+09	1.0046	1.3429	.9504	.6966	.9117	.7656	.9405	1.0024	1.0116	1.0143	.9994	.9992
.800	.114E+09	1.0043	1.3423	.9443	.6645	.9009	.7393	.9626	1.0029	1.0130	1.0162	.9991	.9994
.850	.117E+09	1.0041	1.3418	.9380	.6325	.8897	.7128	.9794	1.0035	1.0144	1.0183	.9988	.9996
.900	.119E+09	1.0039	1.3413	.9315	.6007	.8781	.6860	.9911	1.0041	1.0159	1.0204	.9984	.9999
.950	.121E+09	1.0036	1.3409	.9248	.5691	.8662	.6590	.9979	1.0048	1.0173	1.0226	.9979	1.0000
1.000	.122E+09	1.0034	1.3406	.9179	.5381	.8540	.5321	1.0000	1.0056	1.0186	1.0248	.9971	1.0000
1.050	.123E+09	1.0032	1.3404	.9110	.5076	.8416	.6053	.9978	1.0064	1.0196	1.0271	.9961	.9998
1.100	.124E+09	1.0031	1.3404	.9041	.4780	.8289	.5789	.9919	1.0073	1.0207	1.0295	.9951	.9997
1.150	.124E+09	1.0029	1.3405	.8967	.4492	.8160	.5527	.9822	1.0083	1.0214	1.0318	.9938	.9993
1.200	.124E+09	1.0025	1.3409	.8894	.4215	.8030	.5271	.9696	1.0094	1.0222	1.0342	.9924	.9991
1.250	.123E+09	1.0023	1.3414	.8820	.3948	.7897	.5020	.9539	1.0105	1.0225	1.0365	.9908	.9985
1.300	.122E+09	1.0021	1.3421	.8746	.3690	.7764	.4775	.9356	1.0117	1.0225	1.0388	.9888	.9977
1.350	.121E+09	1.0020	1.3431	.8671	.3445	.7629	.4537	.9153	1.0129	1.0223	1.0410	.9867	.9968
1.400	.120E+09	1.0018	1.3444	.8597	.3211	.7494	.4306	.8931	1.0143	1.0218	1.0431	.9844	.9958
1.450	.118E+09	1.0016	1.3460	.8521	.2988	.7357	.4082	.8692	1.0156	1.0207	1.0451	.9816	.9943
1.500	.116E+09	1.0014	1.3479	.8446	.2776	.7220	.3865	.8439	1.0170	1.0191	1.0469	.9785	.9926
1.550	.114E+09	1.0013	1.3501	.8371	.2576	.7082	.3657	.8177	1.0185	1.0170	1.0485	.9752	.9907
1.600	.112E+09	1.0011	1.3528	.8296	.2387	.6944	.3457	.7907	1.0200	1.0145	1.0499	.9717	.9885
1.650	.109E+09	1.0010	1.3559	.8220	.2208	.6805	.3264	.7629	1.0216	1.0111	1.0510	.9675	.9858
1.700	.107E+09	1.0009	1.3594	.8145	.2041	.6665	.3080	.7351	1.0232	1.0075	1.0518	.9635	.9832
1.750	.104E+09	1.0007	1.3634	.8070	.1884	.6526	.2905	.7071	1.0248	1.0033	1.0523	.9592	.9804
1.800	.102E+09	1.0006	1.3680	.7996	.1738	.6386	.2737	.6790	1.0264	.9984	1.0524	.9544	.9771
1.850	.992E+08	1.0005	1.3730	.7921	.1600	.6246	.2577	.6509	1.0281	.9925	1.0521	.9492	.9733
1.900	.965E+08	1.0004	1.3787	.7847	.1472	.6105	.2426	.6234	1.0297	.9863	1.0513	.9440	.9695
1.950	.938E+08	1.0003	1.3849	.7773	.1353	.5965	.2282	.5961	1.0314	.9793	1.0501	.9385	.9653
2.000	.911E+08	1.0002	1.3918	.7699	.1242	.5824	.2146	.5695	1.0330	.9716	1.0484	.9328	.9610

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

F. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.68606E-04	.37602E-03	.7034
.050	1.3451	.68467E-04	.37545E-03	.7035
.100	1.3579	.68405E-04	.37519E-03	.7035
.150	1.3571	.68302E-04	.37477E-03	.7035
.200	1.3602	.68159E-04	.37418E-03	.7034
.250	1.3568	.67976E-04	.37343E-03	.7034
.300	1.3598	.67755E-04	.37253E-03	.7034
.350	1.3567	.67496E-04	.37147E-03	.7034
.400	1.3531	.67201E-04	.37027E-03	.7033
.450	1.3562	.66871E-04	.36892E-03	.7032
.500	1.3538	.66508E-04	.36745E-03	.7029
.550	1.3533	.66113E-04	.36585E-03	.7027
.600	1.3550	.65688E-04	.36380E-03	.7030
.650	1.3518	.65235E-04	.36096E-03	.7045
.700	1.3505	.64755E-04	.35797E-03	.7060
.750	1.3511	.64251E-04	.35483E-03	.7075
.800	1.3483	.63723E-04	.35156E-03	.7090
.850	1.3485	.63173E-04	.34817E-03	.7105
.900	1.3480	.62603E-04	.34466E-03	.7118
.950	1.3463	.62015E-04	.34106E-03	.7130
1.000	1.3449	.61410E-04	.33737E-03	.7141
1.050	1.3440	.60788E-04	.33360E-03	.7149
1.100	1.3453	.60151E-04	.32975E-03	.7155
1.150	1.3431	.59502E-04	.32585E-03	.7159
1.200	1.3449	.58840E-04	.32190E-03	.7159
1.250	1.3448	.58165E-04	.31789E-03	.7156
1.300	1.3440	.57480E-04	.31385E-03	.7149
1.350	1.3454	.56786E-04	.30977E-03	.7139
1.400	1.3469	.56082E-04	.30567E-03	.7123
1.450	1.3472	.55369E-04	.30154E-03	.7103
1.500	1.3480	.54647E-04	.29735E-03	.7079
1.550	1.3509	.53917E-04	.29075E-03	.7107
1.600	1.3533	.53179E-04	.28413E-03	.7131
1.650	1.3543	.52432E-04	.27748E-03	.7151
1.700	1.3601	.51678E-04	.27082E-03	.7168
1.750	1.3634	.50917E-04	.26415E-03	.7180
1.800	1.3668	.50148E-04	.25747E-03	.7188
1.850	1.3701	.49371E-04	.25077E-03	.7192
1.900	1.3772	.48587E-04	.24408E-03	.7192
1.950	1.3822	.47794E-04	.23737E-03	.7187
2.000	1.3890	.46994E-04	.23067E-03	.7178

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

G. (CONTINUED)

MACH	LOCAL ISENTROPIC EXPANSION COEFF.	VISCOSITY G/CM-SEC	THERMAL CONDUCTIVITY CAL/CM-SEC-K	PRANDTL NUMBER
0.000	I	.89743E-04	.46228E-03	.7104
.050	1.3899	.89803E-04	.46215E-03	.6908
.100	1.3870	.89715E-04	.46176E-03	.6908
.150	1.3938	.89568E-04	.46112E-03	.6909
.200	1.3916	.89367E-04	.46022E-03	.6910
.250	1.3983	.89102E-04	.45908E-03	.6911
.300	1.3910	.88787E-04	.45769E-03	.6912
.350	1.3944	.88417E-04	.45608E-03	.6913
.400	1.3914	.87997E-04	.45424E-03	.6915
.450	1.3909	.87527E-04	.45220E-03	.6917
.500	1.3919	.87011E-04	.44996E-03	.6920
.550	1.3874	.86451E-04	.44754E-03	.6922
.600	1.3884	.85850E-04	.44494E-03	.6925
.650	1.3872	.85210E-04	.44229E-03	.6927
.700	1.3846	.84535E-04	.43957E-03	.6928
.750	1.3841	.83826E-04	.43672E-03	.6930
.800	1.3836	.83089E-04	.43376E-03	.6932
.850	1.3813	.82324E-04	.43070E-03	.6934
.900	1.3818	.81536E-04	.42757E-03	.6937
.950	1.3791	.80726E-04	.42436E-03	.6940
1.000	1.3769	.79899E-04	.42109E-03	.6943
1.050	1.3757	.79059E-04	.41777E-03	.6947
1.100	1.3704	.78198E-04	.41441E-03	.6950
1.150	1.3702	.77331E-04	.41103E-03	.6955
1.200	1.3690	.76454E-04	.40764E-03	.6958
1.250	1.3665	.75571E-04	.40415E-03	.6964
1.300	1.3654	.74683E-04	.40036E-03	.6974
1.350	1.3618	.73791E-04	.39657E-03	.6984
1.400	1.3599	.72898E-04	.39280E-03	.6993
1.450	1.3572	.72004E-04	.38904E-03	.7002
1.500	1.3555	.71110E-04	.38531E-03	.7009
1.550	1.3536	.70219E-04	.38161E-03	.7015
1.600	1.3511	.69329E-04	.37793E-03	.7020
1.650	1.3503	.68444E-04	.37430E-03	.7023
1.700	1.3487	.67562E-04	.37071E-03	.7024
1.750	1.3455	.66683E-04	.36715E-03	.7022
1.800	1.3446	.65810E-04	.36363E-03	.7018
1.850	1.3433	.64941E-04	.35866E-03	.7039
1.900	1.3427	.64078E-04	.35327E-03	.7067
1.950	1.3411	.63217E-04	.34795E-03	.7092
2.000	1.3405	.62363E-04	.34269E-03	.7113

TABLE V. REAL-GAS ISENTROPIC EXPANSIONS OF PARAHYDROGEN

TT = 300.0 K PT = 10.0 ATM RHOT = .814E-03 G/CM3 SVT =1317.507 M/SEC

MACH	RE/M	Z	CP/CV	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A	SV/SVT	P/PT	T/TT	RHO/RHOT	A*/A
									-------RELATIVE TO IDEAL GAS VALUES-------				
0.000	0.	1.0059	1.3709	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
.050	.596E+07	1.0059	1.3865	.9997	.9982	.9995	.9987	.0864	1.0000	1.0000	1.0000	1.0000	1.0019
.100	.119E+08	1.0059	1.3864	.9989	.9930	.9981	.9949	.1721	.9999	.9999	1.0001	.9999	1.0018
.150	.177E+08	1.0058	1.3862	.9976	.9844	.9957	.9887	.2562	.9999	1.0000	1.0001	.9999	1.0017
.200	.234E+08	1.0058	1.3859	.9958	.9725	.9923	.9801	.3380	.9998	1.0000	1.0003	.9999	1.0016
.250	.290E+08	1.0057	1.3856	.9935	.9576	.9881	.9694	.4169	.9997	1.0002	1.0004	1.0000	1.0016
.300	.343E+08	1.0056	1.3852	.9907	.9397	.9829	.9563	.4921	.9995	1.0002	1.0006	.9999	1.0014
.350	.395E+08	1.0055	1.3847	.9873	.9192	.9769	.9413	.5632	.9994	1.0004	1.0008	1.0000	1.0013
.400	.443E+08	1.0054	1.3842	.9836	.8961	.9701	.9243	.6296	.9992	1.0006	1.0011	1.0000	1.0011
.450	.489E+08	1.0053	1.3836	.9794	.8709	.9624	.9055	.6909	.9990	1.0008	1.0014	1.0000	1.0009
.500	.532E+08	1.0051	1.3829	.9747	.8440	.9541	.8853	.7470	.9988	1.0011	1.0018	1.0002	1.0009
.550	.571E+08	1.0050	1.3821	.9697	.8153	.9450	.8635	.7973	.9986	1.0014	1.0022	1.0001	1.0006
.600	.608E+08	1.0048	1.3812	.9642	.7854	.9354	.8406	.8420	.9983	1.0018	1.0027	1.0002	1.0004
.650	.640E+08	1.0046	1.3802	.9584	.7545	.9251	.8167	.8808	.9981	1.0023	1.0033	1.0002	1.0003
.700	.670E+08	1.0045	1.3792	.9523	.7229	.9143	.7918	.9138	.9979	1.0027	1.0039	1.0002	1.0001
.750	.695E+08	1.0043	1.3780	.9459	.6909	.9031	.7663	.9412	.9977	1.0034	1.0047	1.0003	.9999
.800	.718E+08	1.0041	1.3768	.9391	.6586	.8914	.7404	.9630	.9974	1.0042	1.0055	1.0005	.9999
.850	.737E+08	1.0039	1.3755	.9321	.6266	.8793	.7140	.9795	.9972	1.0050	1.0064	1.0006	.9998
.900	.753E+08	1.0038	1.3740	.9249	.5949	.8669	.6877	.9911	.9970	1.0062	1.0074	1.0009	.9999
.950	.766E+08	1.0036	1.3725	.9175	.5636	.8543	.6612	.9978	.9968	1.0074	1.0085	1.0012	1.0000
1.000	.775E+08	1.0034	1.3709	.9098	.5328	.8414	.6348	1.0000	.9967	1.0086	1.0097	1.0014	1.0000
1.050	.782E+08	1.0032	1.3693	.9020	.5028	.8284	.6087	.9981	.9966	1.0100	1.0110	1.0016	1.0001
1.100	.786E+08	1.0031	1.3675	.8941	.4735	.8152	.5826	.9920	.9964	1.0111	1.0124	1.0015	.9999
1.150	.787E+08	1.0029	1.3657	.8861	.4453	.8019	.5570	.9827	.9964	1.0125	1.0140	1.0015	.9999
1.200	.786E+08	1.0027	1.3638	.8779	.4182	.7885	.5320	.9704	.9963	1.0141	1.0156	1.0017	.9999
1.250	.783E+08	1.0026	1.3619	.8697	.3921	.7752	.5075	.9553	.9963	1.0157	1.0174	1.0017	.9999
1.300	.778E+08	1.0024	1.3600	.8614	.3672	.7618	.4837	.9379	.9964	1.0175	1.0193	1.0017	1.0001
1.350	.771E+08	1.0023	1.3580	.8531	.3434	.7484	.4605	.9182	.9965	1.0191	1.0212	1.0015	.9999
1.400	.762E+08	1.0021	1.3561	.8447	.3207	.7351	.4379	.8967	.9967	1.0207	1.0233	1.0012	.9998
1.450	.752E+08	1.0020	1.3541	.8364	.2992	.7219	.4161	.8737	.9969	1.0222	1.0255	1.0007	.9995
1.500	.740E+08	1.0019	1.3522	.8281	.2789	.7088	.3950	.8495	.9971	1.0237	1.0278	1.0001	.9991
1.550	.727E+08	1.0017	1.3504	.8198	.2596	.6958	.3747	.8243	.9974	1.0251	1.0301	.9993	.9987
1.600	.713E+08	1.0016	1.3485	.8115	.2415	.6829	.3551	.7983	.9978	1.0263	1.0325	.9983	.9981
1.650	.699E+08	1.0015	1.3468	.8032	.2244	.6701	.3364	.7719	.9982	1.0276	1.0350	.9973	.9974
1.700	.683E+08	1.0014	1.3451	.7951	.2084	.6575	.3184	.7451	.9987	1.0287	1.0375	.9960	.9967
1.750	.667E+08	1.0013	1.3436	.7869	.1933	.6450	.3011	.7180	.9993	1.0293	1.0400	.9943	.9955
1.800	.650E+08	1.0012	1.3422	.7789	.1792	.6326	.2846	.6909	.9999	1.0298	1.0426	.9924	.9942
1.850	.633E+08	1.0011	1.3410	.7709	.1660	.6204	.2689	.6639	1.0006	1.0299	1.0451	.9902	.9927
1.900	.616E+08	1.0010	1.3400	.7630	.1537	.6084	.2539	.6372	1.0013	1.0298	1.0477	.9878	.9910
1.950	.598E+08	1.0009	1.3391	.7552	.1422	.5965	.2395	.6107	1.0021	1.0293	1.0501	.9850	.9890
2.000	.581E+08	1.0009	1.3384	.7475	.1314	.5848	.2259	.5847	1.0029	1.0283	1.0526	.9819	.9867